

IN TWO SECTIONS

SEPTEMBER 1955 — SHOW NUMBER

SECTION ONE

MACHINERY

Multiply Gear Production by 5!

Bevel gears with localized tooth bearing cut from the solid in one rapid operation by the new Gleason No. 104 Straight Bevel Coniflex® Genera-

tor. Production rates increased 5 to 1. Quick setup makes machine ideal for small lots or for quantity production. Write for leaflet.



GLEASON WORKS

Builders of bevel gear machinery for over 90 years

1000 UNIVERSITY AVE., ROCHESTER 3, N.Y.

A REPORT TO INDUSTRY

The New Frontier in Production Economy



by A. Francis Townsend
Vice President - Engineering
The Heald Machine Company

Let's call it "automation"—this new frontier we're talking about. Briefly, it means doing things automatically that used to be done by hand or by manual supervision. Productionwise, it opens a vast new field for making substantial cost savings and at the same time improving the quality of the product.

In the machine tool field, we might say that there are two different types of automation—both mighty important.

FIRST, there's the "big automation." That covers the completely automated set-ups involving a number of machine stations, with fully automatic handling of the work as it goes down the line. For large parts, we have the so-called "transfer machine," where the work advances from one station to the next "in series." For smaller work that can be conveyor or hopper fed, an automated production line may consist of a multiplicity of stations, each made up of as many identical machines as are needed to equalize production flow throughout the line. We have a two-unit set-up like this on display at the Show, where automotive pistons are bored and elliptical box turned in a continuous flow with automatic conveying, orienting, loading, boring, unloading, flushing, gaging and sorting.

SECOND, there's the "little automation." This covers newly automated features of an individual machine. A classic example of this is *feedback*—where the finished work is gaged and intelligence from the gaging unit is fed back to the machine, automatically compensating for tool or wheel wear. Feedback on internal grinders is another new development demonstrated at the Show. Here, after-gaging results are fed back to the diamond unit, automatically changing its position to correct for any tendencies to deviate from the required tolerance. Feedback means less operator effort and attention—assures maximum sustained efficiency of the overall automated production setup. You'll hear much more of this as time goes on.

Automatic loading, gaging, sizing and sorting are other examples of the same thing—letting the machine do a job that used to be done by hand. In addition to the all-important factors of time and cost, these automated operations eliminate the element of human error. A properly functioning machine never gets tired, angry or careless.

Automation is purely a matter of economics. How far you should go—a balance between initial investment and improvement in production cost. But whatever the job, we at Heald are confident that proper application of these new developments will enable you to obtain higher efficiency and lower cost per part than ever before.

For further description of the new Heald equipment, please turn to Pages 30 and 31 in this issue.

Now, more than ever before, it PAYS to come to Heald

THE HEALD MACHINE COMPANY
Worcester 6, Massachusetts

Branch Offices: Chicago • Cleveland • Dayton • Detroit • Indianapolis • New York



In Two Sections

SEPTEMBER, 1955 — SHOW NUMBER

Section Two

MACHINERY

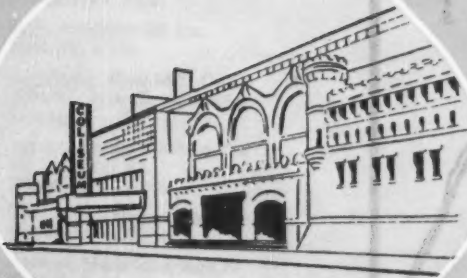


EXHIBIT FINDER

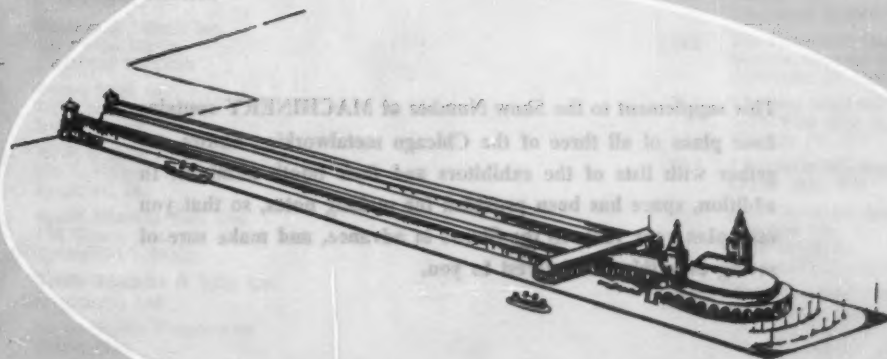
Floor plans and lists of
exhibitors at

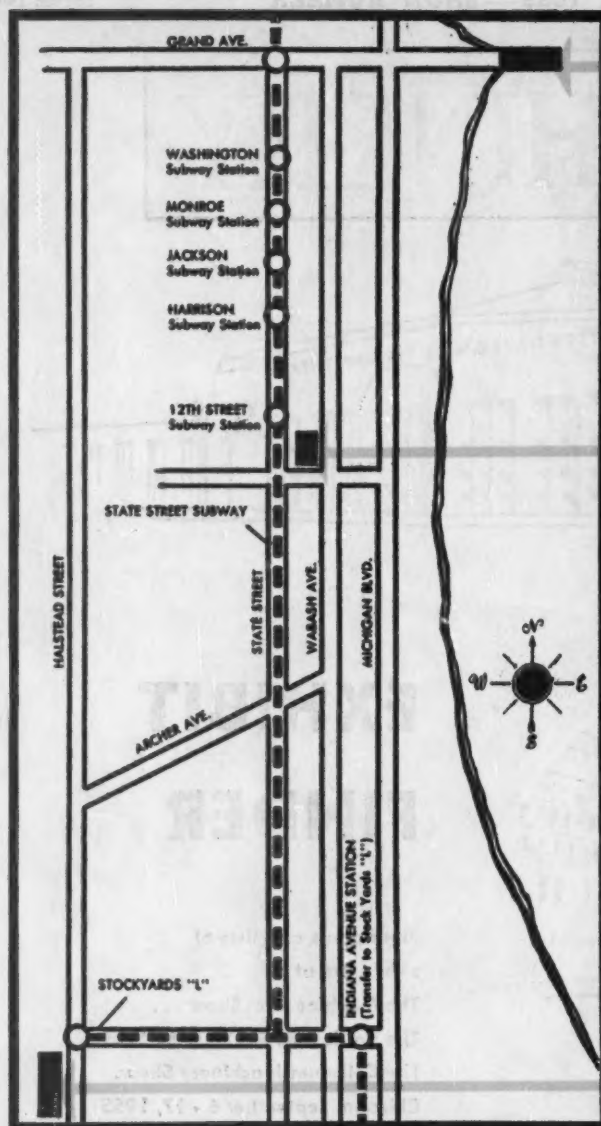
The Machine Tool Show . . .

The Production Engineering Show . . .

The Coliseum Machinery Show.

Chicago, September 6 - 17, 1955





**PRODUCTION
ENGINEERING SHOW
NAVY PIER**
Foot of Grand Avenue
Hours: 1 PM - 10 PM
Sept. 6-16
Closed Sunday

**COLISEUM
MACHINERY SHOW
CHICAGO COLISEUM**
1513 S. Wabash Avenue
Hours: 10 AM - 10:30 PM
Sept. 6-17
Closed Sunday

**MACHINE TOOL SHOW
INTERNATIONAL AMPHITHEATRE**
43rd and S. Halsted Street
Hours: 10 AM - 5:30 PM
Sept. 6-17
Closed Sunday

This supplement to the Show Number of **MACHINERY** contains floor plans of all three of the Chicago metalworking Shows, together with lists of the exhibitors and their booth numbers. In addition, space has been provided for making notes, so that you may plan your visits to the Shows in advance, and make sure of seeing everything of interest to you.

EXHIBITORS AT THE MACHINE TOOL SHOW

BOOTH

- 317** Abrasive Machine Tool Co.
12 Dunellen Rd.
East Providence 14, R. I.
- 1309** The Ajax Manufacturing Co.
Euclid Branch P. O.
Cleveland 17, Ohio
- 417** American Gage & Machine Co.
4709 West Kinzie St.
Chicago 44, Ill.
- 5-1** American Machine Tool
Distributors Assn.
Philadelphia 3, Pa.
- 1121** American Society of
Mechanical Engineers
New York 18, N. Y.
- 126** American Steel Foundries
King & Elmes Divisions
1150 Tennessee Ave.
Cincinnati 29, Ohio
- 420** The American Tool Works Co.
Pearl & Eggleston Aves.
Cincinnati 2, Ohio
- 225** F. E. Anderson Oil Co.
Portland, Conn.
- 416** Armstrong Blum Mfg. Co.
5700 W. Bloomingdale Ave.
Chicago 37, Ill.
- 1308** Arter Grinding Machine Co.
15 Sagamore Rd.
Worcester 5, Mass.
- 316** The Avey Drilling Machine Co.
Cincinnati 1, Ohio
- 519** Axelson Manufacturing Co.
6160 S. Boyle Ave.
Los Angeles 58, Calif.
- 1421** Baker Bros., Inc.
Station F, P. O. Box 101
Toledo 10, Ohio
- 203** Baldwin-Lima-Hamilton Corp.
Hamilton, Ohio
- 1322** Barber-Colman Co.
626 Rock St.
Rockford, Ill.
- 325** Bardons & Oliver, Inc.
1133 West 9th St.
Cleveland 13, Ohio
- 818** Barnes Drill Co.
820 Chestnut St.
Rockford, Ill.
- 1223** W. F. & John Barnes Co.
301 S. Water St.
Rockford, Ill.
- 515** Baush Machine Tool Co.
156 Wason Ave.
Springfield 7, Mass.
- 614** Beatty Machine & Mfg. Co.
Hammond, Ind.
- 911** Besley-Welles Corporation
Beloit, Wis.

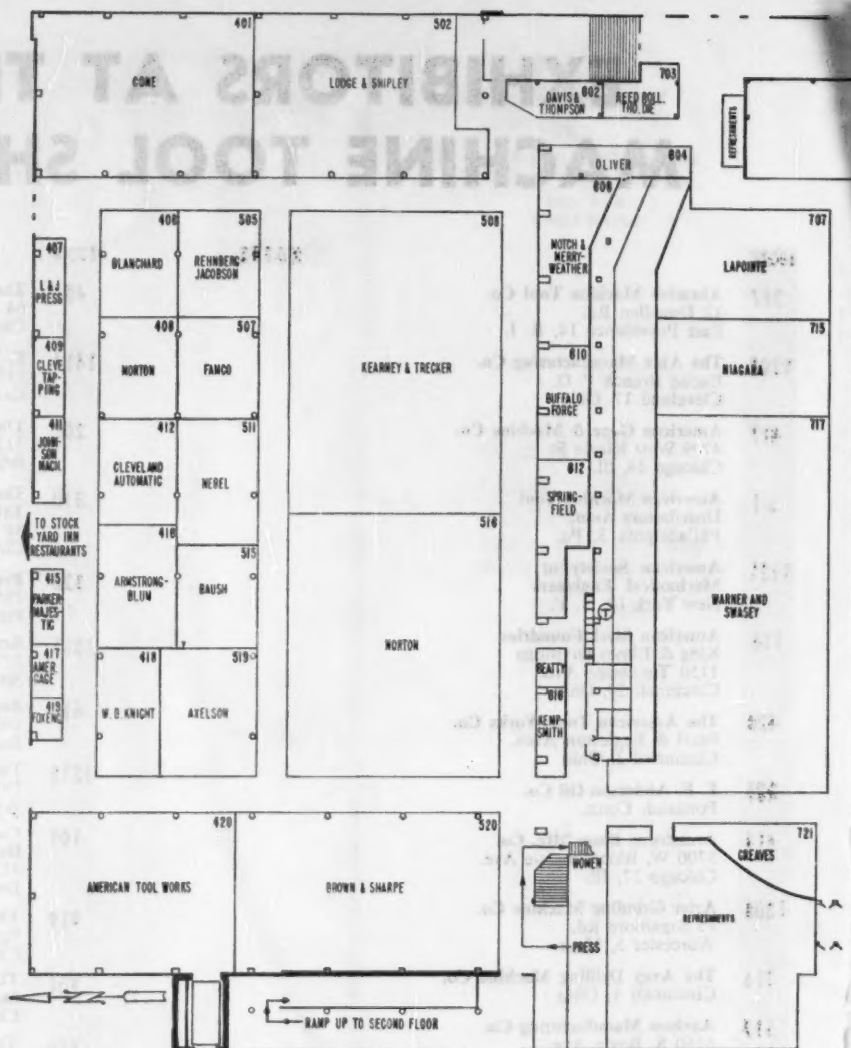
NOTES

BOOTH

- 406** The Blanchard Machine Co.
64 State St.
Cambridge 39, Mass.
- 1414** E. W. Bliss Co.
1375 Raff Rd., S.W.
Canton, Ohio
- 209** The Bodine Corp.
317 Mountain Grove St.
Bridgeport 5, Conn.
- 310** The Boye & Emmes Machine
Tool Co.
81 Caldwell Drive
Cincinnati 16, Ohio
- 520** Brown & Sharpe Mfg. Co.
235 Promenade St.
Providence 1, R. I.
- 1015** Bryant Chucking Grinder Co.
257 Clinton St.
Springfield, Vermont
- 610** Buffalo Forge Co.
440 Broadway
Buffalo, N. Y.
- 1213** The Bullard Co.
286 Canfield Ave.
Bridgeport 2, Conn.
- 109** Carboloy
Dept. of General Electric Co.
11147 E. 8 Mile Rd.
Detroit 32, Mich.
- 919** The Carlton Machine Tool Co.
Spring Grove Ave. & Meeker St.
Cincinnati 25, Ohio
- 901** The Cincinnati Bickford Tool Co.
Oakley
Cincinnati 9, Ohio
- 816** The Cincinnati-Gilbert
Machine Tool Co.
3366 Beekman St.
Cincinnati 23, Ohio
- 309** Cincinnati Lathe & Tool Co.
3268 Disney
Cincinnati 9, Ohio
- 1205** The Cincinnati Milling
Machine Co.
Oakley
Cincinnati 9, Ohio
- 1105** The Cincinnati Shaper Co.
Hopple, Garrard & Elam Sts.
Cincinnati 25, Ohio
- 716** Clearing Machine Corporation
6499 West 65th St.
Chicago 38, Ill.
- 1007** Cleerehan Machine Tool Co.
Green Bay, Wis.
- 412** The Cleveland Automatic
Machine Co.
4932 Beech St.
Norwood, Cincinnati 12, Ohio
- 1418** The Cleveland Crane &
Engineering Co.
5462 E. 281st St.
Wickliffe, Ohio

INTERNATIONAL AMPHITHEATRE

Ground Floor



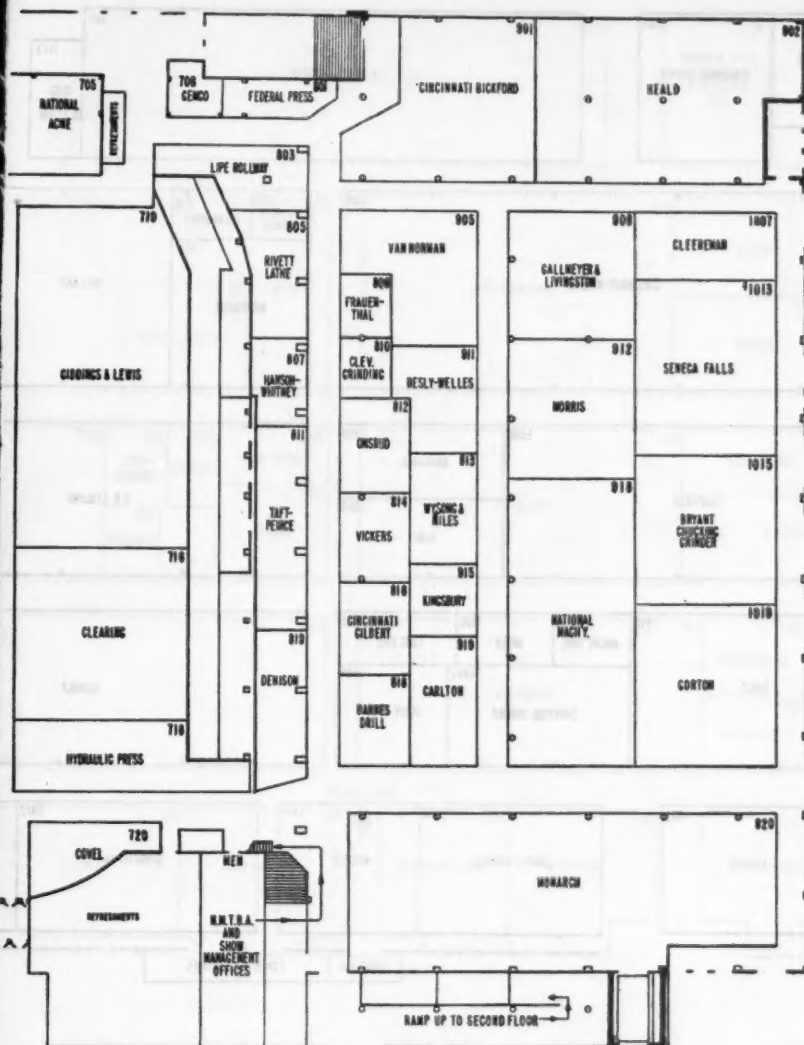
BOOTH

- 810** The Cleveland Grinding Machine Co.
1643 Eddy Rd.
Cleveland 12, Ohio
- 409** The Cleveland Tapping Machine Co.
1201 Camden Ave., S.W.
Canton 6, Ohio
- 1112** Colonial Broach Co.
21601 Hoover Rd.
Detroit 13, Mich.
- 401** Cone Automatic Machine Co., Inc.
Windsor, Vermont
- 217** Consolidated Machine Tool Co.
Division of
Farrel-Birmingham Co., Inc.
Rochester 10, N. Y.
- 720** Covell Manufacturing Co.
Benton Harbor, Mich.
- 1118** The Cross Company
3250 Bellevue Ave.
Detroit 7, Mich.

NOTES

BOOTH

- 302** Cutting Tool Mfg. Assn.
Detroit 20, Mich.
- 1302** Danly Machine Specialties, Inc.
2100 S. Laramie Ave.
Chicago 50, Ill.
- 602** Davis & Thompson Co.
6411 W. Burnham St.
Milwaukee 16, Wis.
- 819** The Denson Engineering Co.
1160 Dublin Rd.
Columbus 16, Ohio
- 1317** DeVlieg Machine Co.
450 Fair Ave.
Detroit 20, Mich.
- 1214** Economy Engineering Co.
108 Vine St.
Willoughby, Ohio
- 1115** Edlund Machinery Co.
Cortland, N. Y.
- 1319** Ex-Cell-O Corporation
1200 Oakman Blvd.
Detroit 32, Mich.



INTERNATIONAL AMPHITHEATRE

Ground Floor

TO EXPOSITION HALL
Floor Plan on Next Page

MAIN
ENTRANCE

NOTES

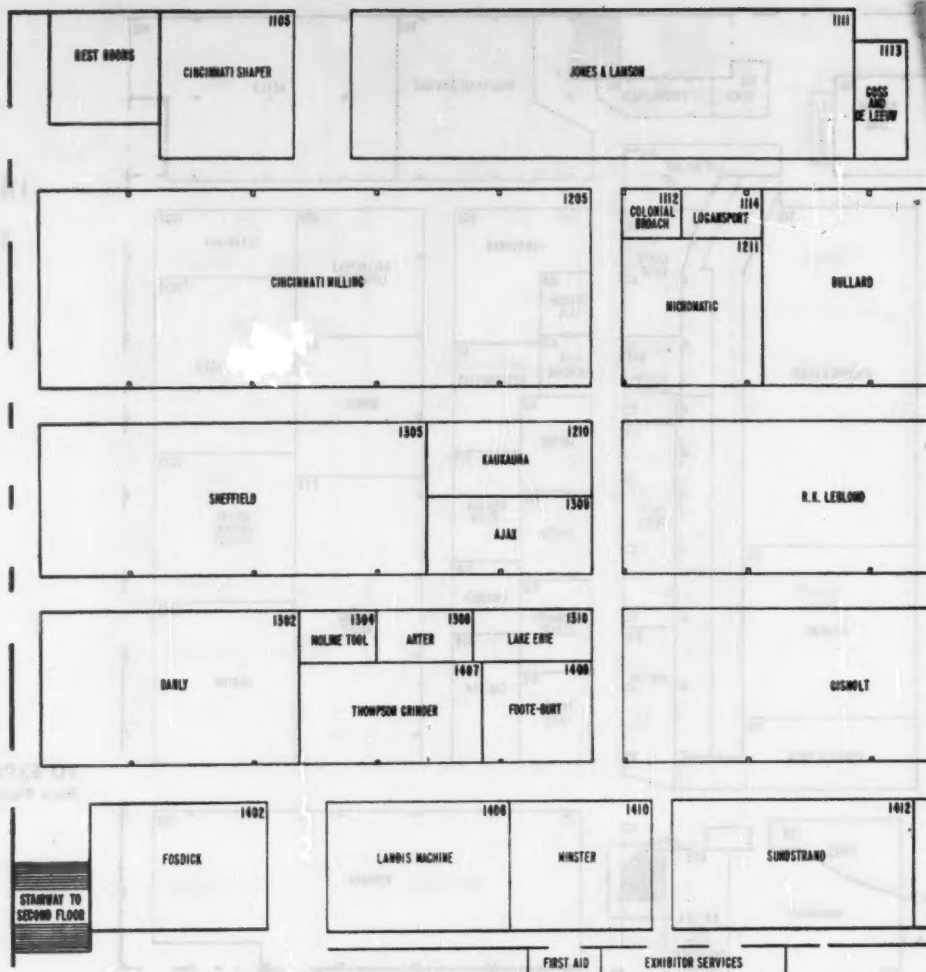
BOOTH

- 507** Ramco Machine Co.
3100 Sheridan Rd.
Kenosha, Wis.
- 801** Federal Press Co.
511 Division St.
Elkhart, Ind.
- 1416** The Fellows Gear Shaper Co.
78 River St.
Springfield, Vermont
- 1311** Ferracute Machine Co.
429 E. Commerce St.
Bridgeton, N. J.
- 208** Fitchburg Engineering Corp.
Fitchburg, Mass.
- 1409** The Foote-Burt Co.
13000 St. Clair Ave.
Cleveland 8, Ohio
- 1402** The Fostick Machine Tool Co.
Blue Rock & Apple Sts.
Cincinnati 23, Ohio

BOOTH

- 419** Fox Engineering Co.
1336 Francis St.
Jackson, Mich.
- 806** Frauenthal Division
The Kaydon Engineering Corp.
930 W. Sherman Blvd.
Muskegon, Mich.
- 906** Gallmeyer & Livingston Co.
305 Straight Ave., S.W.
Grand Rapids, Mich.
- 1115** Gardner Machine Co.
Beloit, Wis.
- 315** Gear Grinding Machine Co.
3901 Christopher St.
Detroit 11, Mich.
- 706** Gemco Shaper Co.
4417 Oleatha Ave.
St. Louis 16, Mo.
- 223** Geometric Tool Co. Div.
Greenfield Tap & Die Corp.
Blake & Valley Sts.
New Haven 15, Conn.

**INTERNATIONAL
AMPHITHEATRE**
Exposition Hall



NOTES

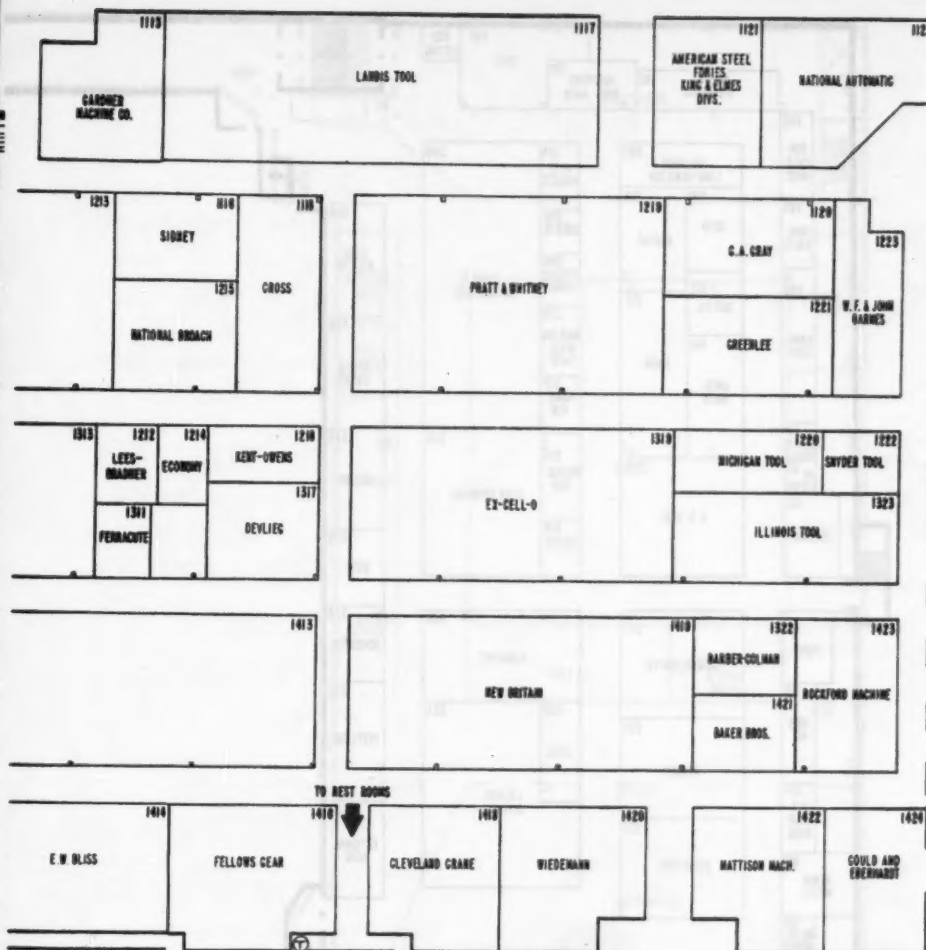
BOOTH

- 710** Giddings & Lewis Machine Tool Co.
Fond du Lac, Wis.
- 1413** Gisholt Machine Co.
1245 E. Washington Ave.
Madison 10, Wis.
- 1019** George Gorton Machine Co.
Racine, Wis.
- 1113** The Goss & DeLeeuw Machine Co.
Kensington, Conn.
- 1424** Gould & Eberhardt, Inc.
433 Fabyan Place
Irvington 11, N. J.
- 1120** The G. A. Gray Co.
3611 Woodburn Ave.
Cincinnati 7, Ohio
- 721** Greaves Machine Tool Div.
J. D. Fay & Egan Co.
2011 Eastern Ave.
Cincinnati 2, Ohio
- 1221** Greenlee Bros. & Co.
2100 Twelfth St.
Rockford, Ill.

BOOTH

- 212** The Hamilton Tool Co.
Hamilton, Ohio
- 807** Hanson-Whitney Co.
169 Bartholomew Ave.
Hartford 2, Ohio
- 201** Hartford Special Machinery Co.
Hartford 12, Conn.
- 902** The Heald Machine Co.
10 New Bond St.
Worcester 6, Mass.
- 221** Hendey Machine Division
Barber-Colman Co.
Rockford, Ill.
- 318** E. F. Houghton & Co.
303 W. Lehigh Ave.
Philadelphia, Pa.
- 718** The Hydraulic Press Mfg. Co.
1042 Marion Rd.
Mount Gilead, Ohio
- 1323** Illinois Tool Works
2501 N. Keeler Ave.
Chicago 39, Ill.

Show Supplement



**INTERNATIONAL
AMPHITHEATRE**
Exposition Hall

BOOTH

- 411** Johnson Machine & Press Corp.
620 West Indiana Ave.
Elkhart, Ind.
- 1111** Jones & Lamson Machine Co.
160 Clinton St.
Springfield, Vt.
- 1210** Kaukauna Machine Corp.
1000 Lincoln Ave.
Kaukauna, Wis.
- 508** Kearney & Trecker Corp.
6784 W. National Ave.
Milwaukee 14, Wis.
- 616** The Kempsmith Machine Co.
1819 South 7th St.
Milwaukee 14, Wis.
- 123** Kennametal, Inc.
1 Lloyd Ave.
Latrobe, Pa.
- 1218** Kent-Owens Machine Co.
958 Wall St.
Toledo 10, Ohio
- 915** Kingsbury Machine Tool Corp.
110 Laurel St.
Keene, N. H.

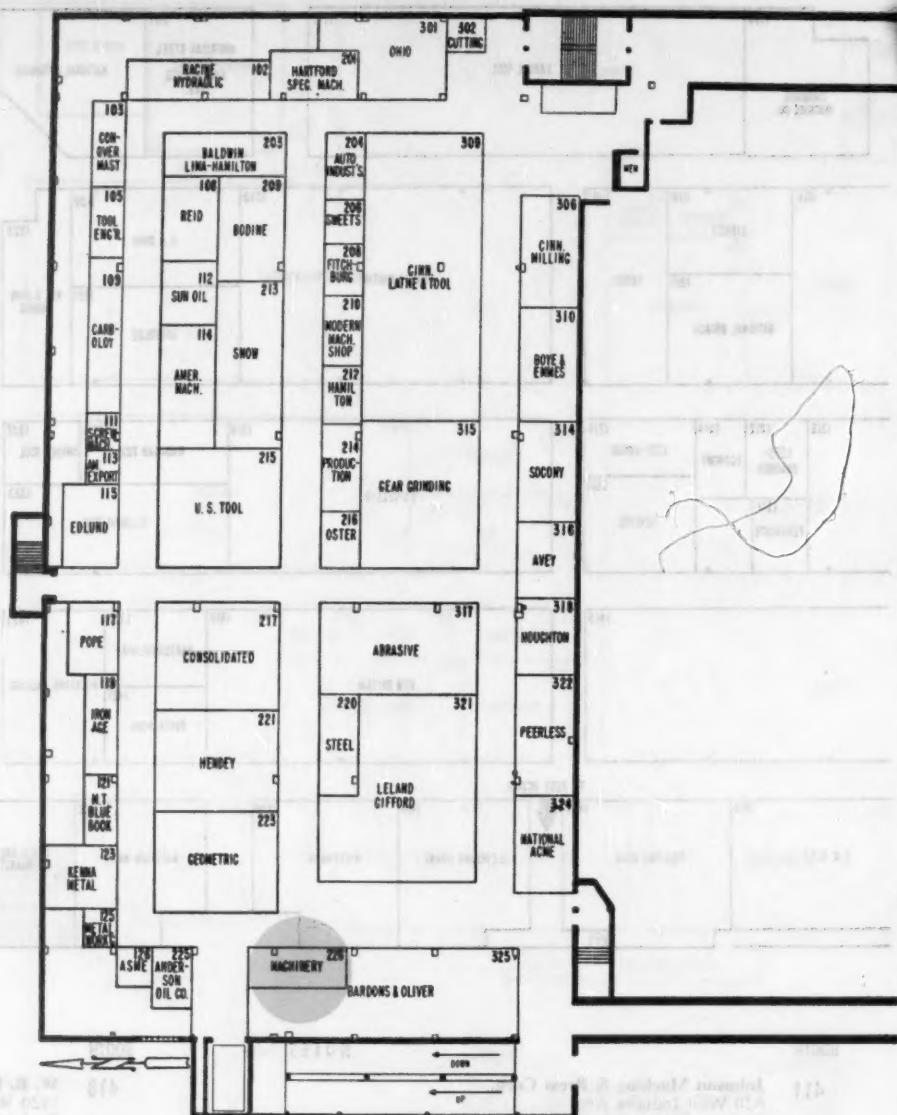
NOTES

BOOTH

- 418** W. B. Knight Machinery Co.
3920 West Pine Blvd.
St. Louis 8, Mo.
- 407** L & J Press Corporation
824 Ren St.
Elkhart, Ind.
- 1310** Lake Erie Engineering Corp.
470 Woodward Ave.
Buffalo 17, N. Y.
- 1406** Landis Machine Co.
Waynesboro, Pa.
- 1117** Landis Tool Co.
Waynesboro, Pa.
- 707** The Lapointe Machine Tool Co.
Hudson, Mass.
- 1313** The R. K. LeBlond Mach. Tool Co.
Madison & Edwards Rds.
Cincinnati 8, Ohio
- 1212** The Lees-Bradner Co.
12120 Elmwood Ave.
Cleveland 11, Ohio
- 321** Leland-Gifford Co.
1001 Southbridge St.
Worcester, Mass.

INTERNATIONAL AMPHITHEATRE

Second Floor
North Hall



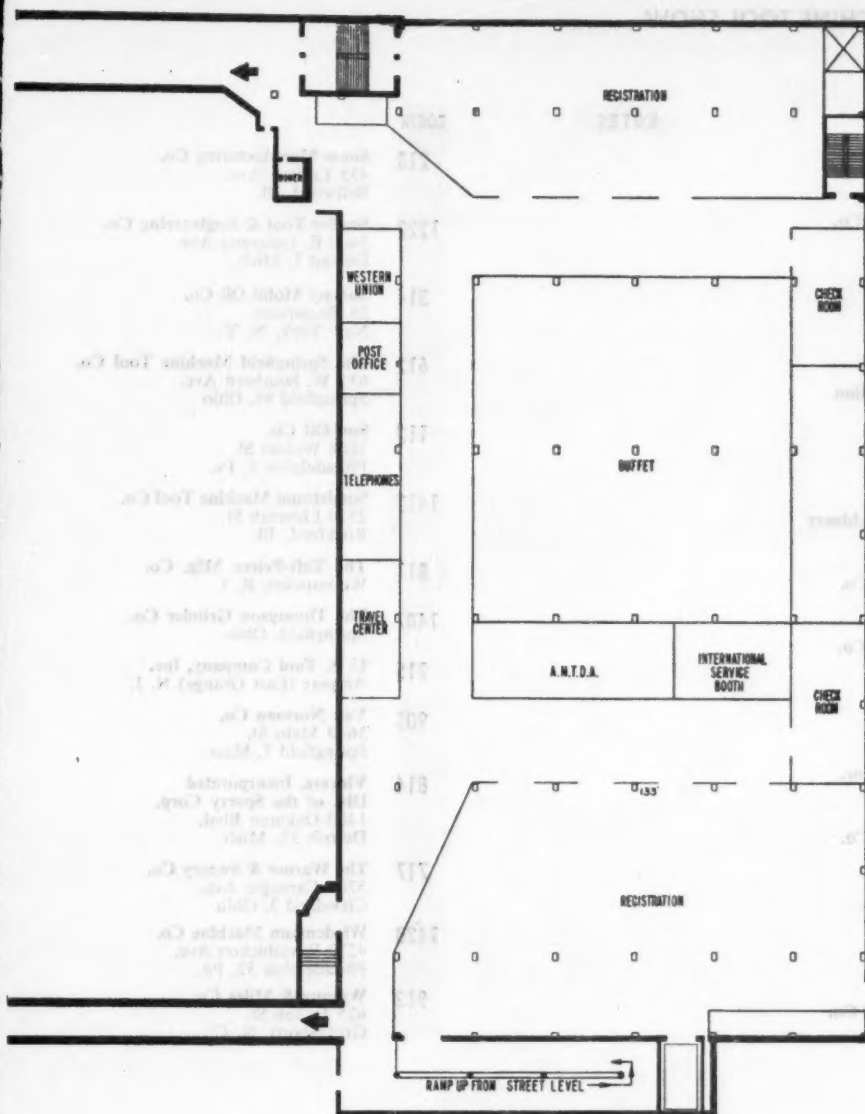
BOOTH

- 803** Lipe Rollway Corp.
Syracuse 1, N. Y.
- 502** The Lodge & Shipley Co.
3055 Colerain Ave.
Cincinnati 25, Ohio
- 1114** Logansport Machine Co., Inc.
Logansport, Ind.
- 226** MACHINERY
93 Worth Street
New York 13, N. Y.
- 1422** Mattison Machine Works
Blackhawk Park Ave.
Rockford, Ill.
- 1220** Michigan Tool Co.
7171 E. McNichols Rd.
Detroit 12, Mich.

NOTES

BOOTH

- 1211** Micromatic Hone Corp.
8100 Schoolcraft Ave.
Detroit 38, Mich.
- 1410** The Minster Machine Co.
Minster, Ohio
- 1304** Moline Tool Company
100 20th Street
Moline, Ill.
- 920** The Monarch Machine Tool Co.
Sidney, Ohio
- 912** The Morris Machine Tool Co.
946 Harriet St.
Cincinnati 3, Ohio
- 408** Morton Manufacturing Co.
Broadway & Hoyt
Muskegon Heights, Mich.



INTERNATIONAL AMPHITHEATRE

Second Floor
South Hall

BOOTH

- 606** The Motch & Merryweather Machinery Co.
1213 West 3rd St.
Cleveland 13, Ohio
- 324** The National Acme Co.
170 East 131st St.
Cleveland 8, Ohio
- 705**
- 1123** National Automatic Tool Co., Inc.
South 7th and N Sts.
Richmond, Indiana
- 1215** National Broach & Machine Co.
5600 St. Jean Ave.
Detroit 13, Mich.
- 918** The National Machinery Co.
Tiffin, Ohio

NOTES

BOOTH

- 511** The Nebel Machine Tool Co.
3401 Central Parkway
Cincinnati 25, Ohio
- 1419** The New Britain Machine Co.
New Britain, Conn.
- 715** Niagara Machine & Tool Works
683 Northland Ave.
Buffalo 11, N. Y.
- 516** Norton Company
Worcester 6, Mass.
- 301** The Ohio Machine Tool Co.
Kenton, Ohio
- 604** Oliver Instrument Co.
1410 E. Maumee St.
Adrian, Mich.

EXHIBITORS AT THE MACHINE TOOL SHOW

BOOTH

- 812** Onsrud Machine Works, Inc.
3900 W. Palmer St.
Chicago 47, Ill.
- 216** The Oster Manufacturing Co.
2057 East 61st Place
Cleveland 3, Ohio
- 415** Parker-Majestic, Inc.
147 Jos. Campau Ave.
Detroit 7, Mich.
- 322** Peerless Machine Co.
Racine, Wis.
- 117** Pope Machinery Corporation
261 River St.
Haverhill, Mass.
- 1219** Pratt & Whitney Division
Niles-Bement-Pond Co.
West Hartford 1, Conn.
- 102** Racine Hydraulics & Machinery
2000 Albert St.
Racine, Wis.
- 703** Reed Rolled Thread Die Co.
791 Main St.
Holden, Mass.
- 505** Rehnberg-Jacobson Mfg. Co.
2135 Kishwaukee St.
Rockford, Ill.
- 100** Reid Bros. Co., Inc.
138-140 Elliott St.
Beverly, Mass.
- 805** Rivett Lathe & Grinder, Inc.
18 Riverview Rd.
Boston 35, Mass.
- 1423** Rockford Machine Tool Co.
2500 Kishwaukee St.
Rockford, Ill.
- 1013** Seneca Falls Machine Co.
Seneca Falls, N. Y.
- 1305** The Sheffield Corporation
Springfield St.
Dayton 1, Ohio
- 1116** The Sidney Machine Tool Co.
Sidney, Ohio

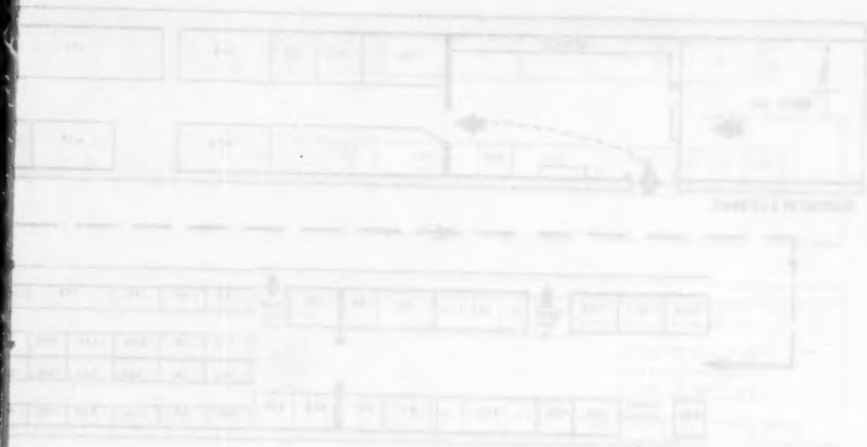
NOTES

BOOTH

- 213** Snow Manufacturing Co.
435 Eastern Ave.
Bellwood, Ill.
- 1222** Snyder Tool & Engineering Co.
3400 E. Lafayette Ave.
Detroit 7, Mich.
- 314** Socony Mobil Oil Co.
26 Broadway
New York, N. Y.
- 612** The Springfield Machine Tool Co.
631 W. Southern Ave.
Springfield 99, Ohio
- 112** Sun Oil Co.
1608 Walnut St.
Philadelphia 3, Pa.
- 1412** Sundstrand Machine Tool Co.
2530 Eleventh St.
Rockford, Ill.
- 811** The Taft-Peirce Mfg. Co.
Woonsocket, R. I.
- 1407** The Thompson Grinder Co.
Springfield, Ohio
- 215** U. S. Tool Company, Inc.
Ampere (East Orange) N. J.
- 905** Van Norman Co.
3640 Main St.
Springfield 7, Mass.
- 814** Vickers, Incorporated
Div. of the Sperry Corp.
1400 Oakman Blvd.
Detroit 32, Mich.
- 717** The Warner & Swasey Co.
5701 Carnegie Ave.
Cleveland 3, Ohio
- 1420** Wiedemann Machine Co.
4272 Wissahickon Ave.
Philadelphia 32, Pa.
- 913** Wyson & Miles Co.
625 Fulton St.
Greensboro, N. C.

THE PRODUCTION ENGINEER

NOTES



NORTH
VIEW



SOUTH
VIEW

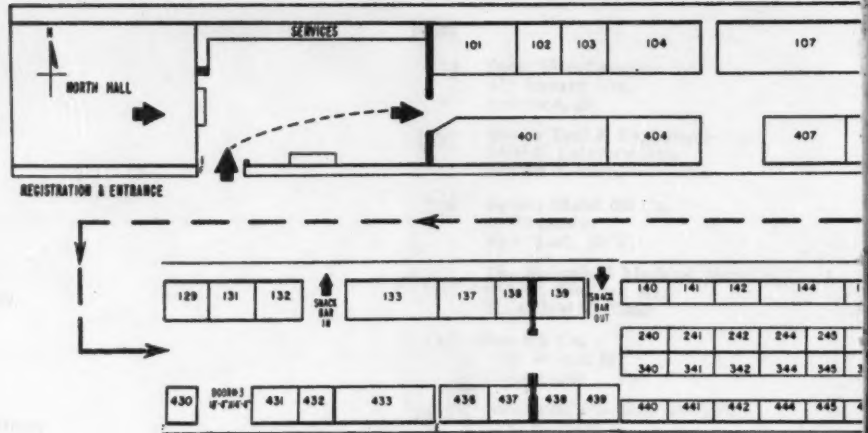
NOTES

1. The factory is situated on a plot of land measuring 100 ft. by 150 ft. The main building is 100 ft. long and 50 ft. wide. The layout is shown in the North and South views. The main building is divided into several sections, each with its own entrance and exit. The entrance is on the left side of the building, and the exit is on the right side. The main building is surrounded by a fence, and there is a gate on the left side. The layout is shown in the North and South views. The main building is divided into several sections, each with its own entrance and exit. The entrance is on the left side of the building, and the exit is on the right side. The main building is surrounded by a fence, and there is a gate on the left side.

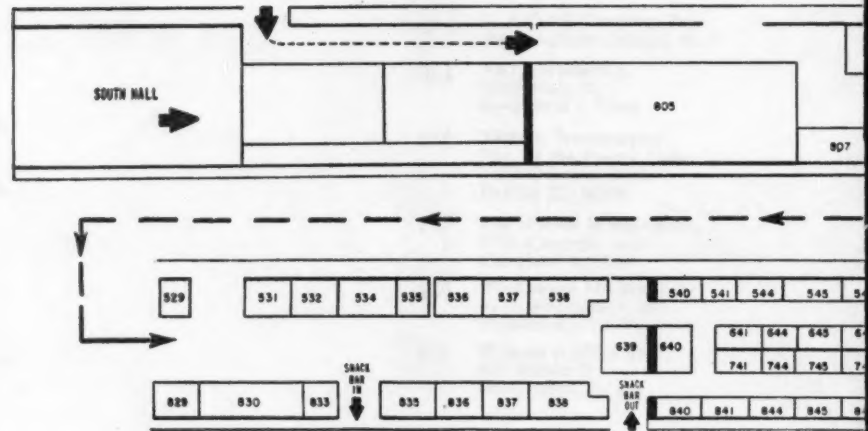
2. The factory is situated on a plot of land measuring 100 ft. by 150 ft. The main building is 100 ft. long and 50 ft. wide. The layout is shown in the North and South views. The main building is divided into several sections, each with its own entrance and exit. The entrance is on the left side of the building, and the exit is on the right side. The main building is surrounded by a fence, and there is a gate on the left side. The layout is shown in the North and South views. The main building is divided into several sections, each with its own entrance and exit. The entrance is on the left side of the building, and the exit is on the right side. The main building is surrounded by a fence, and there is a gate on the left side.

THE PRODUCTION ENGINEERING

NORTH PIER



SOUTH PIER



NOTES

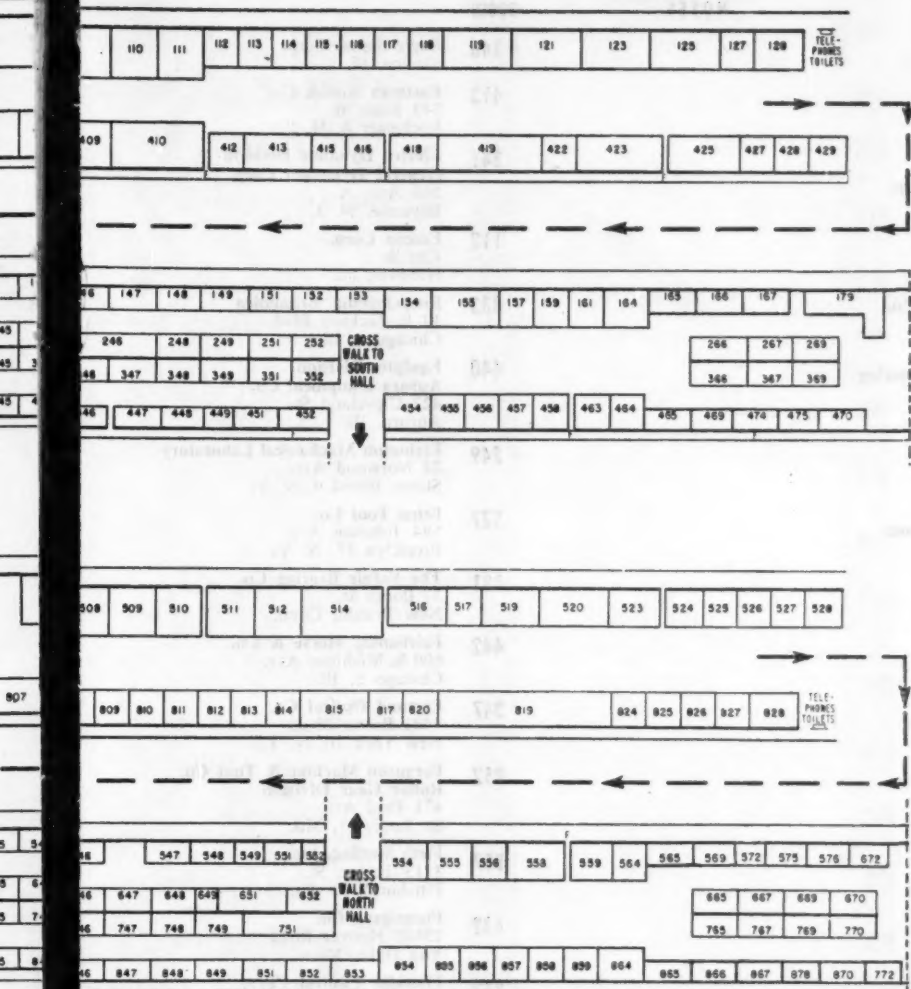
BOOTH

- 445** Adams Carbide Corporation
Kenilworth, N. J.
- 531** Airborne Instruments Laboratory
160 Old Country Road
Mineola, L. I., N. Y.
- 447** Aircraft Marine Products, Inc.
Harrisburg, Pa.
- 575** Alar Design, Inc.
2347 Ferguson Rd.
Cincinnati 38, Ohio
- 416** Alemite Division
Stewart-Warner Corp.
1826 Diversey Pkwy.
Chicago 14, Ill.
- 244** Allen-Bradley Co.
1332 S. Second St.
Milwaukee 4, Wis.
- 119** The Louis Allis Co.
Milwaukee 7, Wis.

BOOTH

- 345** Aloris Tool Co.
131-37 Sanford Ave.
Flushing 55, N. Y.
- 465** American Actuator Corp.
219 E. 44th St.
New York 17, N. Y.
- 101** American Sip Corp.
100 E. 42nd St.
New York, N. Y.
- 516** Ampco Metal, Inc.
1745 S. Thirty-Eighth St.
Milwaukee 46, Wis.
- 855** Apex Tool & Cutter Co.
Shelton, Conn.
- 647** Atlas Pack
Fairhaven, Conn.
- 436** Balance Engineering Co.
5030 W. Lake St.
Chicago, Ill.

ING SHOW — at the NAVY PIER



BOOTH

- 437** Balcrank, Inc.
Disney Street
Cincinnati 9, Ohio
- 452** Barrett-Cravens Co.
630 Dundee Road
Northbrook, Ill.
- 153** The Barry Controls Corp.
700 Pleasant St.
Watertown 72, Mass.
- 475** Bill-Dee Corp.
Automation Products Division
McHenry, Ill.
- 441** G. S. Blakeslee & Co.
1844 S. Laramie Ave.
Chicago 50, Ill.
- 826** Boice Manufacturing Co.
Albany Post Road
Staatsburg, N. Y.

NOTES

BOOTH

- 110** Boston Gear Works
Quincy 71, Mass.
- 640** The Bristol Company
Waterbury, Conn.
- 528** Brooks Equipment & Mfg. Co.
Knoxville, Tenn.
- 511** Charles Bruning Co.
4702 Montrose Ave.
Chicago 41, Ill.
- 141** Buck Manufacturing Co.
100 Roberts Rd.
Los Gatos, Calif.
- 512** C. I. T. Corporation
One Park Ave.
New York 16, N. Y.
- 665** Carboly Department
General Electric Co.
P. O. Box 237—Roosevelt Park
Detroit 32, Mich.

EXHIBITORS AT THE PRODUCTION ENGINEERING SHOW

| BOOTH | NOTES | BOOTH | |
|-------|--|-------|---|
| 418 | Century Electric Co. 1806 Pine St. St. Louis 3, Mo. | 146 | Eagle Signal Corp. Moline, Ill. |
| 529 | Challenge Machinery Co. 19 N. 1st St. Grand Haven, Mich. | 413 | Eastman Kodak Co. 343 State St. Rochester 4, N. Y. |
| 541 | Chemical Development Corp. Danvers, Mass. | 341 | Electro Dynamic Division General Dynamics Corp. 163 Ave. A Bayonne, N. J. |
| 525 | Chicago Dial Indicator Co. 180 N. Wacker Drive Chicago 6, Ill. | 112 | Emeco Corp. Elm St. Hanover, Pa. |
| 147 | Chicago Rivet & Machine Co. 9600 W. Jackson Blvd. Bellwood, Ill. | 833 | Encyclopedia Britannica 14 E. Jackson Blvd. Chicago 4, Ill. |
| 854 | Chicago Wheel & Manufacturing Co. 1101 W. Monroe St. Chicago 7, Ill. | 440 | Equipto Division Aurora Equipment Co. 422 Cleveland St. Aurora, Ill. |
| 840 | The Clark Controller Co. 1146 E. 152nd St. Cleveland 10, Ohio | 249 | Errington Mechanical Laboratory 24 Norwood Ave. Staten Island 4, N. Y. |
| 251 | Clark, Cutler and McDermott Franklin, Mass. | 527 | Etco Tool Co. 594 Johnson Ave. Brooklyn 37, N. Y. |
| 817 | Cleveland Instrument Co. 735 Carnegie Ave. Cleveland 15, Ohio | 131 | The Fafnir Bearing Co. 37 Booth St. New Britain, Conn. |
| 455 | Collins Microflat Co. 2325 E. 8th St. Los Angeles 21, Calif. | 442 | Fairbanks, Morse & Co. 600 S. Michigan Ave. Chicago 5, Ill. |
| 811 | Commercial Filters Corp. 2 Main St. Melrose 76, Mass. | 347 | Farrand Optical Co. 4401 Bronx Blvd. New York 70, N. Y. |
| 444 | Cooper-Weymouth Inc. 277 Noble St. Bridgeport, Conn. | 852 | Ferguson Machine & Tool Co. Roller Gear Division 471 Paul Ave. St. Louis 21, Mo. |
| 549 | Copy-Craft, Inc. 105 Chambers St. New York, N. Y. | 837 | Firth Sterling, Inc. 3113 Forbes St. Pittsburgh 30, Pa. |
| 830 | Crucible Steel Company of America Oliver Bldg. Pittsburgh 30, Pa. | 432 | Formsprag Co. 23601 Hoover Road Van Dyke, Mich. |
| 419 | The Cushman Chuck Co. Hartford 2, Conn. | 342 | Franklin Control Corp. 1975 S. Allis St. Milwaukee 7, Wis. |
| 423 | Cutler Hammer Inc. Milwaukee, Wis. | 749 | Furnas Electric Co. 1000 McKee St. Batavia, Ill. |
| 523 | Delco Products Division General Motors Corp. Dayton 1, Ohio | 511 | Gear Grinding Machine Co. 3901 Christopher St. Detroit 11, Mich. |
| 155 | The DeVilbiss Co. 300 Phillips Ave. Toledo 1, Ohio | 532 | General Box Co. 1825 Miner St. Des Plaines, Ill. |
| 429 | Diehl Manufacturing Co. Somerville, N. J. | 107 | General Electric Co. Schenectady, N. Y. |
| 407 | The DoAll Co. 254 North Laurel Ave. Des Plaines, Ill. | 540 | Graham Transmissions, Inc. Menomonee Falls, Wis. |
| 446 | Drillmation Co. 21511 John R St. Hazel Park, Mich. | 548 | Green Instrument Co. 385 Putnam Ave. Cambridge 39, Mass. |
| 547 | The Dumore Co. Racine, Wis. | 810 | Hamilton Automation, Inc. 1490 Edison Ave. Hamilton, Ohio |
| 151 | Durant Manufacturing Co. 1929 N. Buffum St. Milwaukee 1, Wis. | 751 | Hamilton Manufacturing Co. Two Rivers, Wis. |

EXHIBITORS AT THE PRODUCTION ENGINEERING SHOW

BOOTH

- 113 F. Ward Harman Associates
Halesite, L. I., N. Y.
- 252 Hevi Duty Electric Co.
Milwaukee 1, Wis.
- 427 Hillyer Instrument Co.
54-60 Lafayette St.
New York 13, N. Y.
- 878 Hi-Lo Tool Products Co.
18525 Weaver Ave.
Detroit 28, Mich.
- 431 The Holo-Krome Screw Corp.
Hartford 10, Conn.
- 836 Horton Chuck Division
E. Horton & Son Co.
Windsor Locks, Conn.
- 519 Hyatt Bearings Division
General Motors Corp.
Harrison, N. J.
- 111 I-T-E Circuit Breaker Co.
Nineteenth & Hamilton Sts.
Philadelphia 30, Pa.
- 165 Illinois Metal Products
429 W. Superior St.
Chicago 10, Ill.
- 825 Imperial Stamp & Engraving Co.
4456 N. Western Ave.
Chicago 25, Ill.
- 139 Industrial Diamond Association
of America
124 E. 40th St.
New York 16, N. Y.
- 814 International Nickel Co.
71 Wall St.
New York 5, N. Y.
- 639 The Charles L. Jarvis Co.
Middletown, Conn.
- 741 Jones & Laughlin Steel Corp.
Pittsburgh 30, Pa.
- 410 Kennametal, Inc.
Latrobe, Pa.
- 526 Koebel Diamond Tool Co.
9456 Grinnel Ave.
Detroit 13, Mich.
- 121 Kux Machine Co.
6725 N. Ridge Ave.
Chicago 24, Ill.
- 510 Lapeer Manufacturing Co.
1144 W. Baltimore
Detroit 2, Mich.
- 133 LaSalle Steel Co.
Hammond, Ind.
- 157 Lee Spring Co.
30 Main St.
Brooklyn 1, N. Y.
- 569 Lehmann Boring Tool Div.
Fulton Iron Works Co.
4389 Duncan Ave.
St. Louis 10, Mo.
- 552 Linemaster Switch Corp.
Woodstock, Conn.
- 433 Link Belt Co.
307 N. Michigan Ave.
Chicago 1, Ill.
- 572 The Lufkin Rule Co.
Saginaw, Mich.

NOTES

BOOTH

- 820 Magnaflex Corp.
7300 W. Lawrence Ave.
Chicago 31, Ill.
- 509 Marathon Electric Mfg. Co.
Wausau, Wis.
- 536 Marlin-Rockwell Corp.
402 Chandler St.
Jamestown, N. Y.
- 809 Marvel Engineering Co.
625 W. Jackson Blvd.
Chicago 6, Ill.
- 123 The Master Electric Co.
Dayton 1, Ohio
- 449 May-Fran Engineering, Inc.
1730 Clarkstone Rd.
Cleveland 12, Ohio.
- 448 Melard Manufacturing Corp.
432 Austin Place
New York 5, N. Y.
- 841 Merkle-Korff Gear Co.
213 N. Morgan St.
Chicago 7, Ill.
- 651 Micrometrical Manufacturing Co.
345 S. Main St.
Ann Arbor, Mich.
- 114 Micro-Poise
Engineering & Sales Co.
14851 Grand River Ave.
Detroit 27, Mich.
- 140 Midwestern Instruments
3401 S. Harvard
Tulsa, Okla.
- 819 Miller Fluid Power Co.
N. Hawthorne St.
Melrose Park, Ill.
- 346 Morrison Machinery Co.
939 W. Lake St.
Chicago 7, Ill.
- 340 Morse Chain Co.
7601 Central
Detroit 10, Mich.
- 551 National Diamond Laboratory
108 Fulton St.
New York 38, N. Y.
- 439 National Pneumatic Co.
Holtzer-Cabot Division
125 Amory St.
Boston 19, Mass.
- 454 Nelson Stud Welding Div.
Gregory Industries, Inc.
Toledo Ave. at 28th St.
Lorain, Ohio
- 537 New Departure Division
General Motors Corp.
Bristol, Conn.
- 430 New Hermes Engraving Co.
13 University Pl.
New York, N. Y.
- 813 New Standard Division
U. S. Expansion Bolt Co.
York, Pa.
- 514 New York Airbrake Co.
230 Park Ave.
New York, N. Y.
- 556 New York Belting and Packing Co.
Rockefeller Center
New York 20, N. Y.

EXHIBITORS AT THE PRODUCTION ENGINEERING SHOW

BOOTH

- 366 Nilsson Gage Co.
257 Mansion St.
Poughkeepsie, N. Y.
- 847 Northwestern Tool & Engrg. Co.
117 Hollier Ave.
Dayton 3, Ohio
- 652 Oakite Products, Inc.
19 Rector St.
New York 6, N. Y.
- 125 O'Neil-Irwin Manufacturing Co.
Lake City, Minn.
- 412 Optical Gaging Products, Inc.
26 Forbest St.
Rochester, N. Y.
- 856 The Osborn Manufacturing Co.
5401 Hamilton Ave.
Cleveland 14, Ohio
- 415 The Parker Appliance Co.
17325 Euclid Ave.
Cleveland 12, Ohio
- 555 Pines Engineering Co.
601 Walnut St.
Aurora, Ill.
- 117 Pacuma-Serve, Inc.
Rocky River, Ohio
- 641 Potter & Brumfield Mfg. Co.
Princeton, Ind.
- 161 PurOlator Products, Inc.
970 New Brunswick Ave.
Rahway, N. J.
- 137 Reliance Electric & Engineering Co.
1087 Ivanhoe Road
Cleveland 10, Ohio
- 344 Ren-Itc Plastics, Inc.
3179 S. Cedar Road
Lansing, Mich.
- 672 Revco Incorporated
2 E. Franklin
Minneapolis 4, Minn.
- 474 J. A. Richards Co.
903 N. Pitcher St.
Kalamazoo, Mich.
- 827 Robinson Aviation, Inc.
Teterboro Air Terminal
Teterboro, N. J.
- 829 Roller Bearing Co. of America
Trenton 3, N. J.
- 179 Rowe Machinery & Mfg. Co.
1506 N. Industrial Blvd.
Dallas 7, Texas
- 824 Safety Socket Screw Co.
6501 North Avondale Ave.
Chicago 31, Ill.
- 348 Saginaw Steering Gear Div.
General Motors Corp.
Saginaw, Mich.
- 245 Schauer Manufacturing Corp.
4500 Alpine Ave.
Cincinnati 36, Ohio
- 864 George Scherr Optical Tools Inc.
200 Lafayette St.
New York 12, N. Y.
- 853 Scott Paper Co.
Chester, Pa.
- 164 Scully-Jones and Co.
1901 S. Rockwell St.
Chicago 8, Ill.

NOTES

BOOTH

- 647 Edward Segal, Inc.
72 Spring St.
New York 12, N. Y.
- 154 Shell Oil Co.
50 W. 50th St.
New York, N. Y.
- 508 The Skinner Chuck Co.
New Britain, Conn.
- 115 The S-P Manufacturing Co.
12415 Euclid Ave.
Cleveland 6, Ohio
- 744 Speed Control Division
Fairchild Engine and Airplane Corp.
90 Riberia St.
St. Augustine, Fla.
- 451 Sperry Products Corp.
Shelter Rock Road
Danbury, Conn.
- 772 Spiral Step Tool Co.
5400 North Damen
Chicago 25, Ill.
- 404 Square D Co.
6060 Rivard St.
Detroit 11, Mich.
- 148 Stackbin Corp.
1079 Main St.
Pawtucket, R. I.
- 464 Standard Oil Co. (Indiana)
910 S. Michigan Ave.
Chicago 80, Ill.
- 828 Standard Pressed Steel Co.
Jenkintown, Pa.
- 144 The L. S. Starrett Co.
121 Crescent St.
Athol, Mass.
- 242 Supreme Products, Inc.
2222 S. Calumet Ave.
Chicago 16, Ill.
- 351 Swiveller Co.
43 34th St.
Brooklyn 32, N. Y.
- 142 Synthane Corp.
Oaks, Pa.
- 554 Syntron Co.
Homer City, Pa.
- 645 Tapmatic Corp.
845 W. 16th St.
Costa Mesa, Calif.
- 546 Teer, Wickwire Inc.
1801 Wildwood
Jackson, Mich.
- 520 G. H. Tennant Co.
2530 N. Second St.
Minneapolis 11, Minn.
- 425 The Timken Roller Bearing Co.
Canton 6, Ohio
- 524 Toledo Scale Co.
Toledo 1, Ohio
- 646 Torit Manufacturing Co.
292 Walnut St.
St. Paul 2, Minn.
- 422 Trabon Engineering Corp.
1814 E. 40th St.
Cleveland 3, Ohio
- 127 Tri-Kris Co.
Walnut & Cleveland Sts.
Lansdale, Pa.

BOOTH

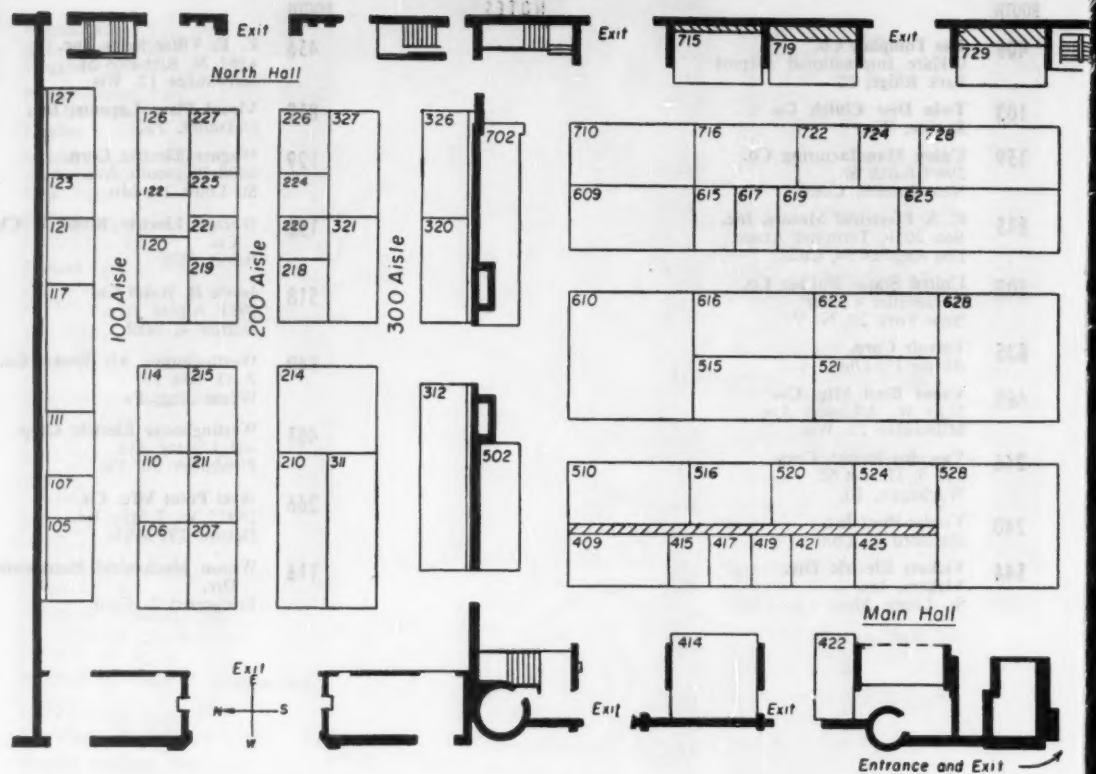
NOTES

BOOTH

- 409** The Tumpane Co.
O'Hare International Airport
Park Ridge, Ill.
- 103** Twin Disc Clutch Co.
Racine, Wis.
- 159** Union Manufacturing Co.
296 Church St.
New Britain, Conn.
- 815** U. S. Electrical Motors, Inc.
Box 2058, Terminal Annex
Los Angeles 54, Calif.
- 102** United States Rubber Co.
Rockefeller Center
New York 20, N. Y.
- 835** Valvair Corp.
Akron 11, Ohio
- 469** Vapor Blast Mfg. Co.
3025 W. Atkinson Ave.
Milwaukee 15, Wis.
- 246** Vascoloy-Ramet Corp.
800 S. Market St.
Waukegan, Ill.
- 240** Veeder-Root Inc.
Hartford 2, Conn.
- 544** Vickers Electric Div.
Vickers, Inc.
St. Louis, Mo.

- 456** E. F. Vilter Sales, Inc.
4161 N. Richards St.
Milwaukee 12, Wis.
- 812** Visual Plant Layouts, Inc.
Oakmont, Pa.
- 129** Wagner Electric Corp.
6400 Plymouth Ave.
St. Louis 14, Mo.
- 152** Warner Electric Brake & Clutch Co.
Beloit, Wis.
- 518** Jervis B. Webb Co.
8951 Alpine Ave.
Detroit 4, Mich.
- 149** Westinghouse Air Brake Co.
P. O. Box 36
Wilmerding, Pa.
- 401** Westinghouse Electric Corp.
401 Liberty Ave.
Pittsburgh 30, Pa.
- 266** West Point Mfg. Co.
26935 W. 7 Mile Rd.
Detroit 19, Mich.
- 116** Wilson Mechanical Instrument Div.
Bridgeport 2, Conn.

EXHIBITORS AT THE COLISEUM



BOOTH

- 444** American Herforder Corp.
1546 No. Orleans St.
Chicago 10, Ill.
- 419** American Positive Grip Vise Corp.
Olivine Street
Willimansett, Mass.
- 120** American Pullmax Co., Inc.
2455 North Sheffield Ave.
Chicago 14, Ill.
- 550** Armstrong Brothers Tool Co.
5200 West Armstrong Ave.
Chicago 30, Ill.
- 123** Atlantic Instrument Corp.
90 Broadway
Norwood, Mass.
- 515** Atlas Press Company
1915 North Pitcher St.
Kalamazoo 13D, Michigan
- 751** Bausbach Machinery Company
221 North Cicero Ave.
Chicago 44, Ill.
- 619** Baird Machine Company
1700 Stratford Ave.
Stratford, Conn.
- 553** Barer Engineering & Machinery
Co., Ltd.
1248 Notre Dame St., W.
Montreal 3, P.Q., Canada

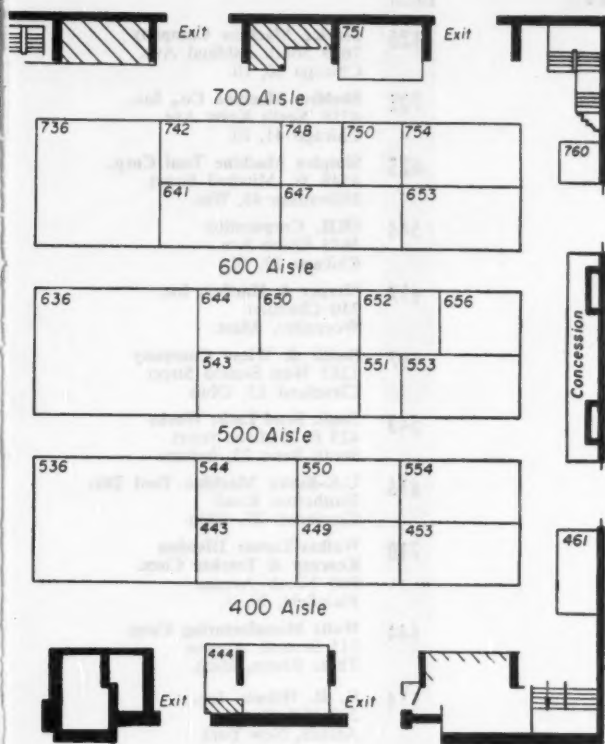
NOTES

BOOTH

- 719** Black Drill Company
1400 East 22nd Street
Cleveland 17, Ohio
- 642** Robert Blohm & Company
Hamburg, Germany
- 715** Boice-Crane Company
930 W. Central Ave.
Toledo 6, Ohio
- 716** Burg Tool Manufacturing Co., Inc.
P. O. Box 48
Gardena, Calif.
- 616** Cincinnati Manufacturing Corp.
Brotherton Road
Cincinnati 27, Ohio
- 516** Clinton Machine Co.
Metalmaster Division
Clinton, Michigan
- 502** Commander Manufacturing Co.
4225 W. Kinzie St.
Chicago 24, Ill.
- 656** Crystal Lake Machine Sales Corp.
P. O. Box 286
Crystal Lake, Ill.
- 105** Dake Engine Company
633 Monroe Street
Grand Haven, Mich.
- 311** A. P. de Sanno & Son, Inc.
Wheatland St.
Phoenixville, Pa.

Show Supplement

MACHINERY SHOW



BOOTH

- 409** Diamond Saw Works, Inc.
260 Court St.
Buffalo 2, New York
- 528** DoAll Company
254 North Laurel Ave.
Des Plaines, Ill.
- 650** East Chicago Machine Tool Corp.
4801 Railroad Ave.
East Chicago, Indiana
- 210** Electro Arc Sales Company
5270 Geddes Road
Ann Arbor, Michigan
- 320** Elgin Tool Works, Inc.
1770 Berteau Ave.
Chicago 13, Ill.
- 215** Fawick Corporation
9919 Clinton Road
Cleveland 11, Ohio
- 609** Fenn Manufacturing Co.
P. O. Box 235
Hartford, Conn.
- 210** Fenway Machine Sales Co., Inc.
263 North 23rd Street
Philadelphia 3, Pa.
- 615** C. Allen Fulmer Co.
First National Bank Bldg.
Cincinnati 2, Ohio
- 736** James W. George Machinery Co.
519 E. Jefferson Ave.
Detroit 26, Michigan

NOTES

BOOTH

- 425** Graham Machine Tool Company
231 Centre St.
New York 13, N. Y.
- 422** Grand Specialties Company
3101 West Grand Ave.
Chicago 22, Ill.
- 110** Grob, Inc.
Grafton, Wisconsin
- 214** Hammond Machinery Builders, Inc.
1600 Douglas Ave.
Kalamazoo, Michigan
- 224** IGMA, Incorporated
347 Madison Avenue
New York 17, N. Y.
- 636** Italian Trade Commission
59 East Madison St., Suite 1601
Chicago 3, Ill.
- 729** Jiffy Tool Supply Co., Inc.
109 East Nine Mile Road
Ferndale 20, Michigan
- 320** I. O. Johansson Company
Chicago, Ill.
- 751** J. M. Kalins Co.
113 E. Washington Ave.
Bridgeport 8, Conn.
- 122** R. S. Kinney Company
118 Church Street
Newtown, Ohio
- 453** Kling Brothers Engineering Works
1320 North Kostner Ave.
Chicago 51, Ill.
- 742** Kropp Forge Company
5301 West Roosevelt Rd.
Chicago 50, Ill.
- 421** Lake Shore Engineering Co.
Iron Mountain, Michigan
- 554** K. O. Lee Company
First Ave., S.E. at Congress
Aberdeen, South Dakota
- 754** M.B.I. Export & Import Ltd.
475 Grand Concourse
Bronx 51, N. Y.
- 750** Machinery Dealers National Assn.
1346 Connecticut Ave., N.W.
Washington 6, D. C.
- 211** Man-Au-Cycle Corp. of America
c/o S & S Machinery Company
140 53rd Street
Brooklyn 32, New York
- 647** Manning, Maxwell & Moore, Inc.
Shaw-Box Crane & Hoist Div.
Muskegon, Michigan
- 636** Maserati Corporation of America
662 Main Street
Westbury, L.I., New York
- 122** Master's with Arboga
7801 South Keeler
Chicago 29, Illinois
- 207** Mead Specialties Company
4114 North Knox Ave.
Chicago 41, Ill.
- 444** Metal Removal Company
1546 No. Orleans St.
Chicago 10, Ill.
- 121** Mitts & Merrill, Inc.
Saginaw, Michigan

EXHIBITORS AT THE COLISEUM MACHINERY SHOW

BOOTH

- 625** Neff, Kohlbusch & Bissell, Inc.
5700 West North Ave.
Chicago 39, Ill.
- 127** Nicholas Equipment Co.
Buckeye & Lincoln Sts.
Bellevue, Ohio
- 123** Nord International Corporation
449 Central Avenue
Orange, N. J.
- 653** O'Neil-Irwin Manufacturing Co.
300 Eighth Avenue
Lake City, Minnesota
- 117** Pangborn Corporation
Hagerstown, Maryland
- 220** Pioneer Tool Engineering Co.
1601 E. El Segundo Blvd.
El Segundo, Calif.
- 521** Portage Machine Company
1033 Sweitzer Ave.
Akron, Ohio
- 622** Production Machine Co.
Wells Street
Greenfield, Mass.
- 111** Raytheon Manufacturing Co.
Equipment Marketing Division
Waltham 54, Mass.
- 748** Reeves Pulley Company
Columbus, Indiana
- 211** S & S Machinery Company
140 53rd Street
Brooklyn 32, New York
- 641** Geo. T. Schmidt, Inc.
4100 Ravenswood Ave.
Chicago 13, Ill.
- 417** Sealol Corporation
45 Willard Ave.
Providence 5, Rhode Island

NOTES

BOOTH

- 126** Service Machine Company
7629 South Ashland Ave.
Chicago 20, Ill.
- 702** Sheldon Machine Co., Inc.
4258 North Knox Ave.
Chicago 41, Ill.
- 625** Simplex Machine Tool Corp.
4548 W. Mitchell Street
Milwaukee 46, Wis.
- 544** SKIL Corporation
5033 Elston Ave.
Chicago 30, Ill.
- 617** Sleeper & Hartley, Inc.
350 Chandler
Worcester, Mass.
- 107** Smith & Wiese Company
1265 West Second Street
Cleveland 13, Ohio
- 543** South Bend Lathe Works
425 E. Madison Street
South Bend 22, Indiana
- 616** U.S.-Burke Machine Tool Div.
Brotherton Road
Cincinnati 27, Ohio
- 710** Walker-Turner Division
Kearney & Trecker Corp.
900 North Avenue
Plainfield, N. J.
- 644** Wells Manufacturing Corp.
315 Seventh Avenue
Three Rivers, Mich.
- 114** K. R. Wilson, Inc.
200 Mill Street
Arcade, New York
- 461** Zagar Tool, Inc.
24000 Lakeland Blvd.
Cleveland 23, Ohio

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MACHINERY
Editorial, Advertising and
Circulation Offices
93 Worth St., New York 13, N. Y.

Editor
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THE INDUSTRIAL PRESS
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NORMAN O. WYNKOOP, Jr.
15937 W. Seven Mile Road
Detroit 35, Mich.

DON HARWAY & COMPANY
1709 W. Eighth St., Los Angeles 17, Calif.

MACHINERY, published monthly by The
Industrial Press, Emmett St., Bristol,
Conn. Executive offices, 93 Worth St.,
New York 13, N.Y.

Subscription Rates: United States and
Canada one year, \$4; two years, \$7;
three years, \$8; foreign countries, one
year, \$7; two years, \$13. Single copies
50 cents, except this special number,
which is \$1. Changes in address must be
received by the fifteenth of the month
to be effective for the next issue. Send
old as well as new address. Copyright
1955 by The Industrial Press.

Entered as second-class mail matter
May 25, 1953, at the Post Office at
Bristol, Conn., under the Act of March
3, 1879. Printed by Hildreth Press, Inc.,
Bristol, Conn., U. S. A.

British Address
MACHINERY
National House, West St.
Brighton 1, England

French Address
LA MACHINE MODERNE
15, Rue Bleue
Paris-IXe, France

BPA

NBP

MACHINERY

VOLUME 62 SEPTEMBER, 1955 NUMBER 1

Special Number that Features the Shows to be Held in Chicago
September 6-17 at the Amphitheatre, Navy Pier, and Coliseum

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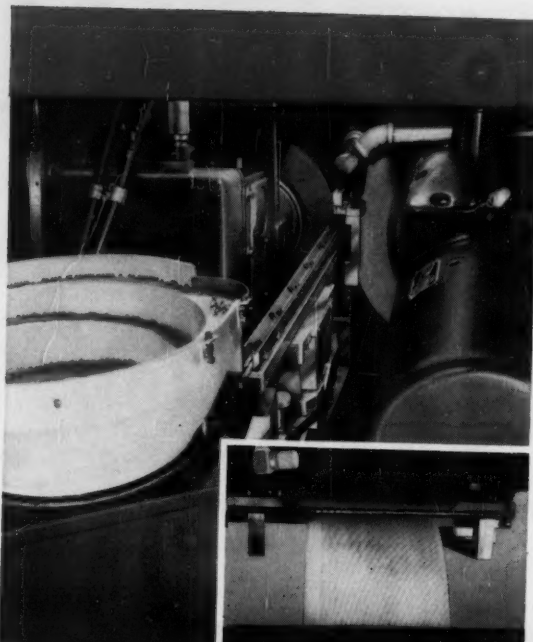
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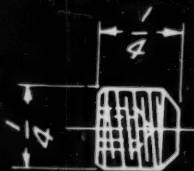


Grinding

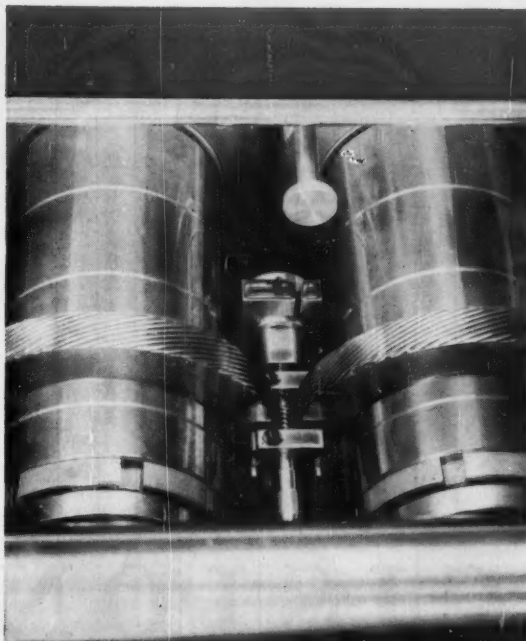
Workpiece: Set Screw

Thread Spec.:
Diameter 1/4"
Thread length 1 1/4"
Type 20P-U.N.C.
Tolerance Class 3

Production: 7,500 pieces per hour

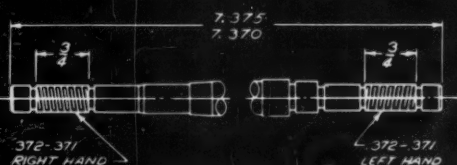


Threading is performed by continuous thru-feed grinding on a #1 LANDIS Centerless Thread Grinder. Operation is automatic—blanks are fed by a vibratory hopper—finished pieces ejected into a tray. This operation indicates the mass production possibilities of the centerless thread grinding method. Infeed grinding may be used for many shouldered workpieces which may not be threaded satisfactorily by either Cutting or Rolling.



Rolling

| | |
|---------------|---|
| Workpiece: | Worm shaft (50 carbon alloy steel of 25 Rockwell C) |
| Thread Spec.: | |
| Diameter | 3/8" |
| Length | 3/4" |
| Type | Triple worm, .100" P, .300" lead |
| Tolerance | .003 concn. with main bearing journals |
| Production: | 12 pieces per minute |




Threading is done by infeed rolling with manual loading on the new LANHYROL Thread Rolling Machine. This operation illustrates the difficult threads which can be rolled. Automatic feeding is available for many operations—thrufeed rolling of Acme Threads on long bars also to be demonstrated.



CUTTING, GRINDING, AND ROLLING THREADS will be demonstrated on the most modern Threading Equipment. 3 of the more than 10 Threading Operations to be shown are illustrated. All of the Threading Machines featured in these operations will be on display for the first time: the LANHYROL Thread Rolling Machine, the Model CLANDMACO Threading Machines, and the #1 Automatic Close Nipple Machine. LANDIS Threading Tools—Die Heads, Collapsible Taps, and Thread Rolling Attachments—will also be shown. Experienced LANDIS Engineers will be glad to help with any problem dealing with method, equipment, or thread design.

LANDIS Machine Company

WAYNESBORO • PENNSYLVANIA • U. S. A.

An abstract graphic design featuring a series of vertical lines of varying heights and thicknesses. A prominent, slightly wavy vertical line runs down the right side of the page. To the left of this line, there are several shorter vertical lines, some of which are dashed. The overall effect is a sense of depth and precision, consistent with the title 'THE PRECISION'.

THE PRECISION

LINE

THE
MACHINE TOOL
SHOW

CHICAGO, ILL.
SEPT. 6-12, 1955

INTERNATIONAL AMPHITHEATRE



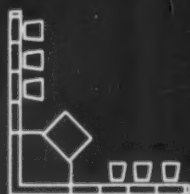
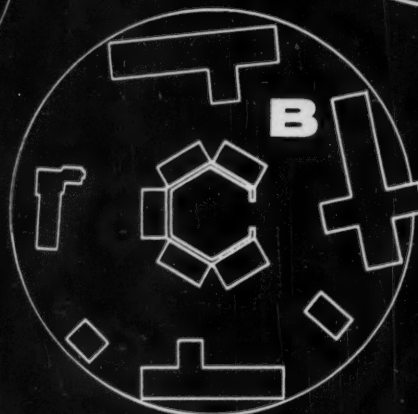
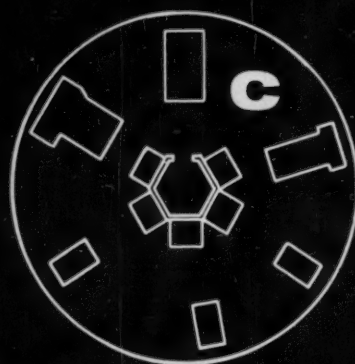
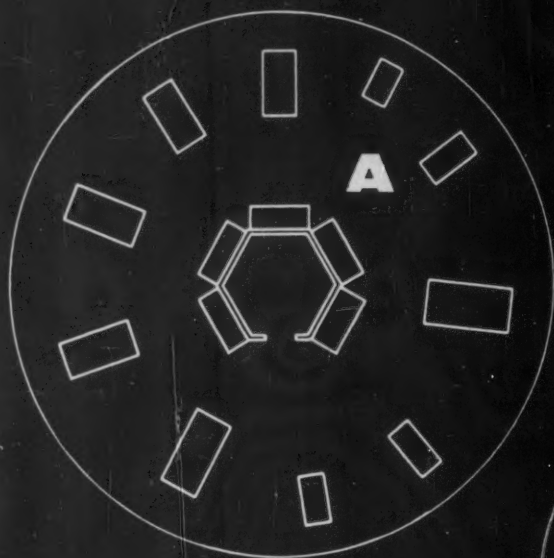
AT THE SHOW ...
BOOTH 1416

Don't miss seeing the latest developments in The Precision Line of Fellows Gear Production Equipment. If you don't make it to the Show... then it will pay you to contact your nearby Fellows Office for the latest facts.

- THE FELLOWS GEAR SHAPER COMPANY,
Head Office and Export Department:
78 River Street, Springfield, Vermont.
Branch Offices: 319 Fisher Building, Detroit 2;
5835 West North Avenue, Chicago 39;
2206 Empire State Building, New York 1;
6214 West Manchester Avenue, Los Angeles 45.

Fellows

Gear Production Equipment



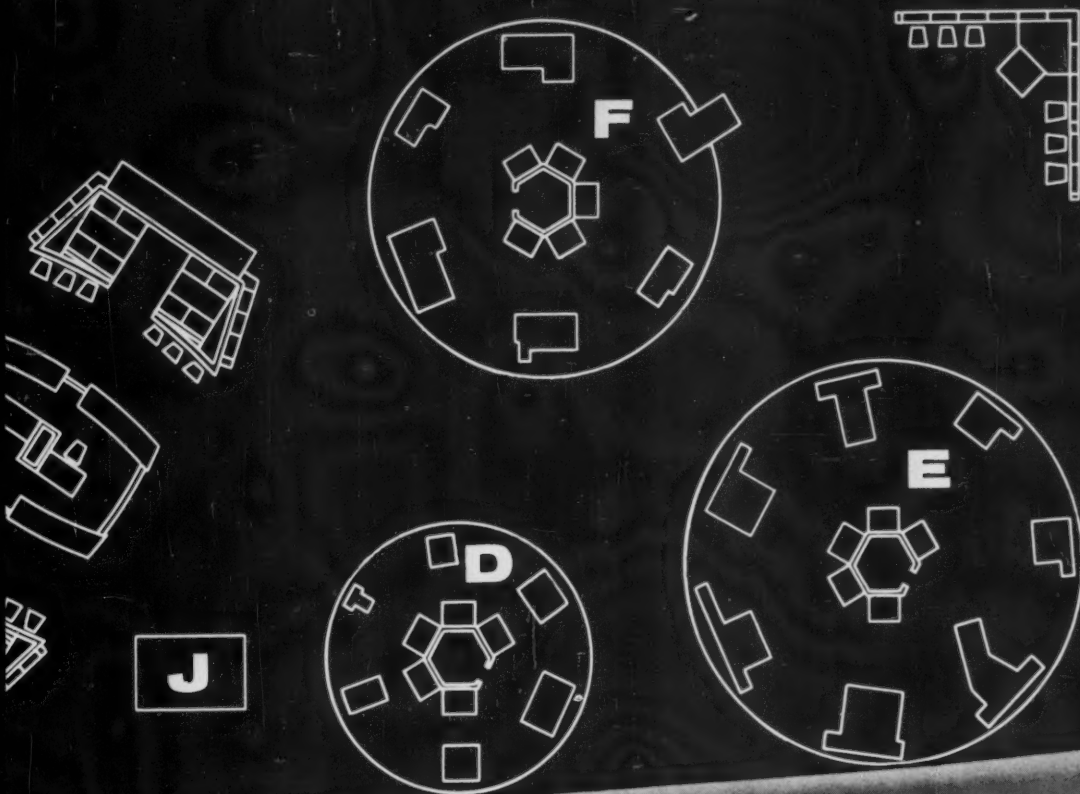
Blueprint for Progress *...in Metalworking*

MACHINE TOOL
SHOW
INTERNATIONAL
AMPHITHEATRE
CHICAGO, ILL.
SEPT. 6-17, 1955

Area
1205

When you visit the Machine Tool Show, keep **1205** in mind. It's a good number to remember, for in this area you will see the newest machine tool products of The Cincinnati Milling Machine Co. Most of them are new from the floor up, and never before have been exhibited. All of them will be in action—many operating on actual production setups that might well have been taken from your shop. Others will be set up so that you might personally get the "feel" of the new features, and more fully realize their advantages. Cincinnati Milling's display may truly be the blueprint to your future progress in metalworking. Be sure to visit **Area 1205**; you'll see new methods and equipment, and you will go away with many practical ideas which can be put to work in your shop.

THE CINCINNATI MILLING MACHINE CO.
CINCINNATI 9, OHIO



Key to NEW Machine

Tools in... *Area 1205*

Exposition Hall, International Amphitheatre,
Chicago, Ill.

SEPTEMBER 6-17

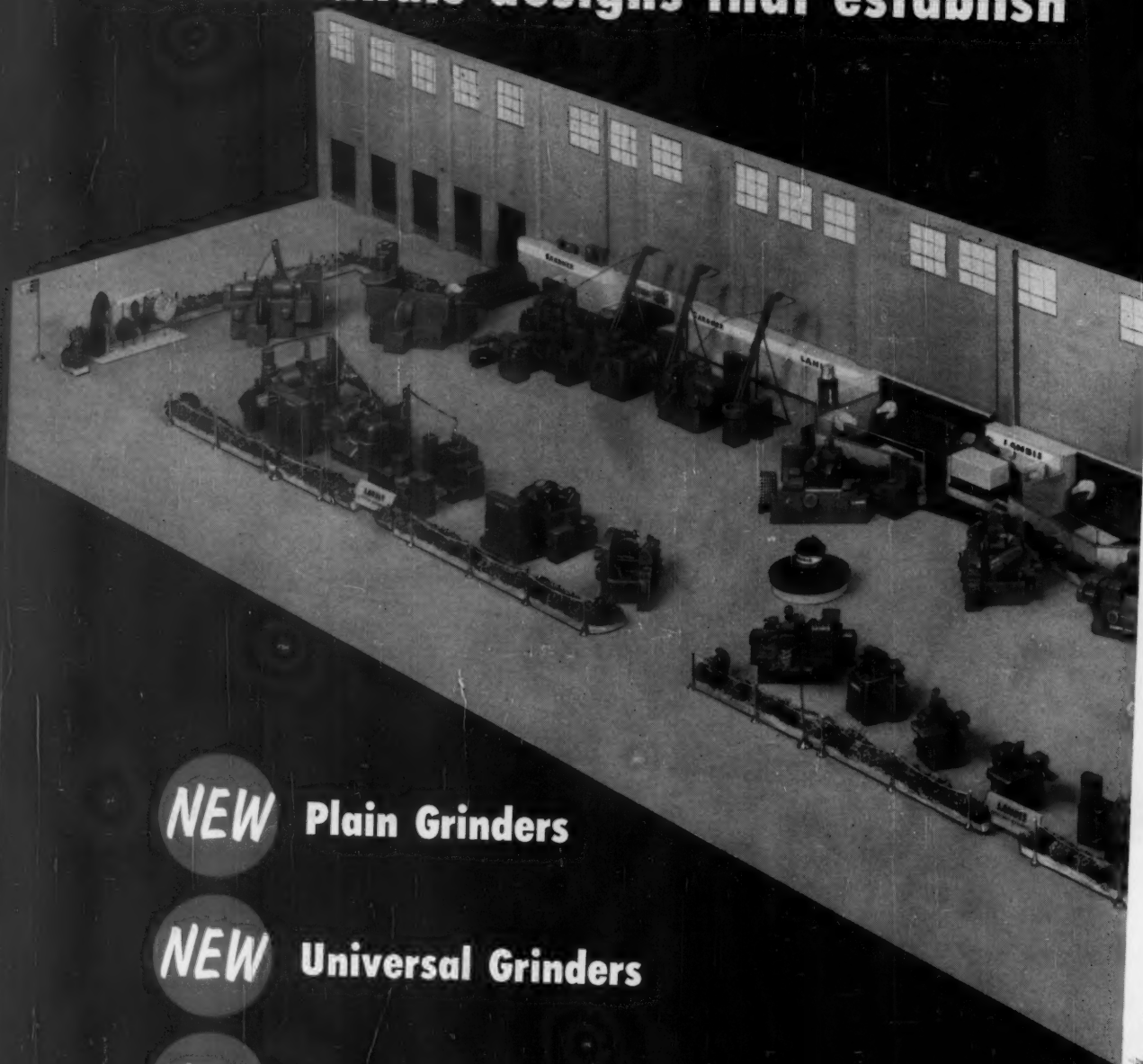
- | | |
|----------|---|
| A | Knee-Type Milling Machines |
| B | Bed Type Milling Machines |
| C | Die Sinking Machines |
| D | Cutter and Tool Grinders, and Surface Grinder |
| E | Centertype Grinding Machines |
| F | Centerless Grinding Machines |
| G | Hydro-Tel Milling Machine |
| H | Hydro-Broach Machine |
| J | Hydroform Machine |



CINCINNATI

MACHINE TOOLS FOR MILLING • BROACHING
GRINDING • CUTTER GRINDING • METAL FORMING

See the Landis designs that establish



NEW Plain Grinders

NEW Universal Grinders

NEW Centerless Grinders

NEW Automation Ideas

NEW Tooling and Gaging Methods

the trends in new precision cylindrical grinders and automation

THE
MACHINE TOOL
SHOW
CHICAGO, ILL.
SEPT. 8-17, 1988
INTERNATIONAL AMPHITHEATRE



Landis Exhibit

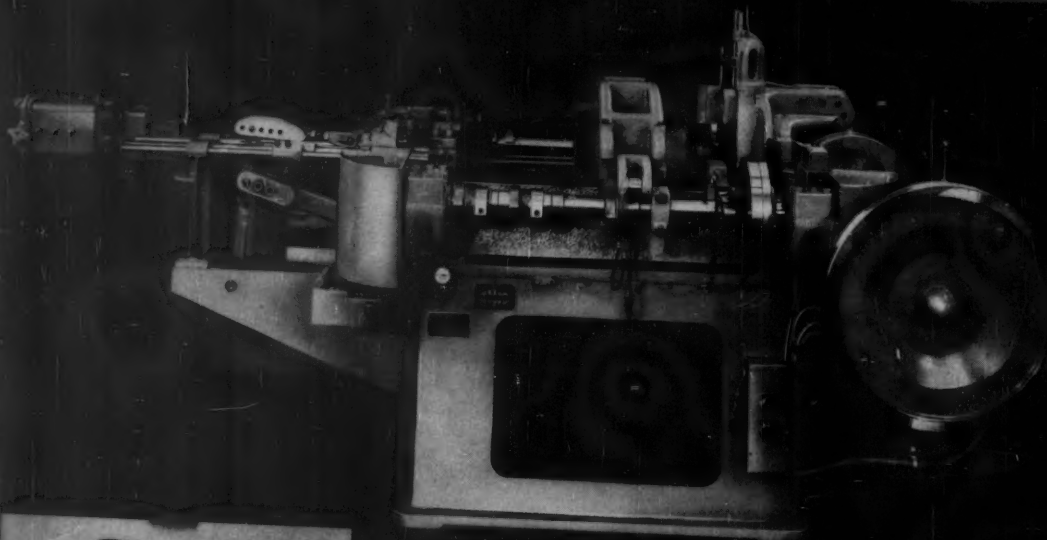
New Annex Building

BOOTH 1117



LANDIS

precision grinders

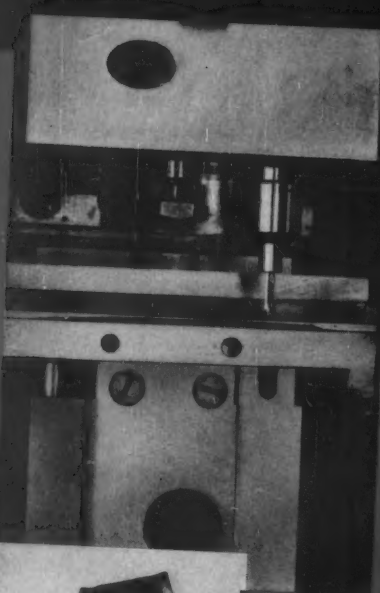


No. 33 U. S. Multi-Slide

Above is shown the No. 33 Multi-Slide Machine which is used, with the addition of a tapping head, for the production of the Allen Bradley Co. part shown below, left. Operation includes the tapping of a 6/32 hole.

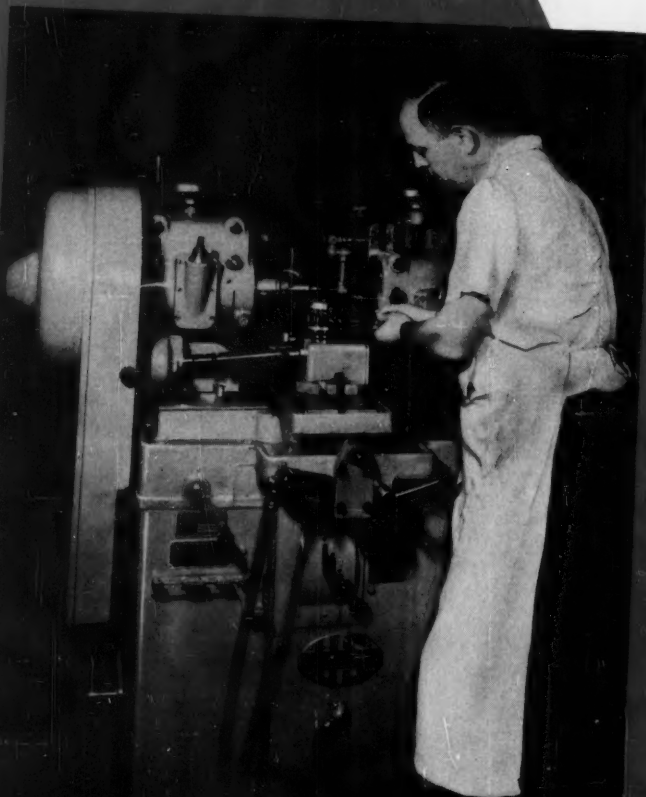
Left: Close-up top view looking down into the tapping position on the U. S. Multi-Slide.

Below, left: Allen Bradley Co. part E10128 (Coil Terminal) produced complete on the No. 33 U. S. Multi-Slide.



U. S. Duplex Multi-Miller

This machine at the Show will be arranged with an automatic indexing feature.



In Production at the Show!

U. S. Multi-Slides and U. S. Multi-Millers Demonstrating Their Potential for Cutting Costs and Increasing Output on Actual Jobs

You, like all manufacturers, are interested in reduced costs per part and increased production. If your program includes the fabrication of formed metal stampings or production milling operations, we believe it will be to your interest to visit our Booth No. 215 at the Machine Tool Show in Chicago.

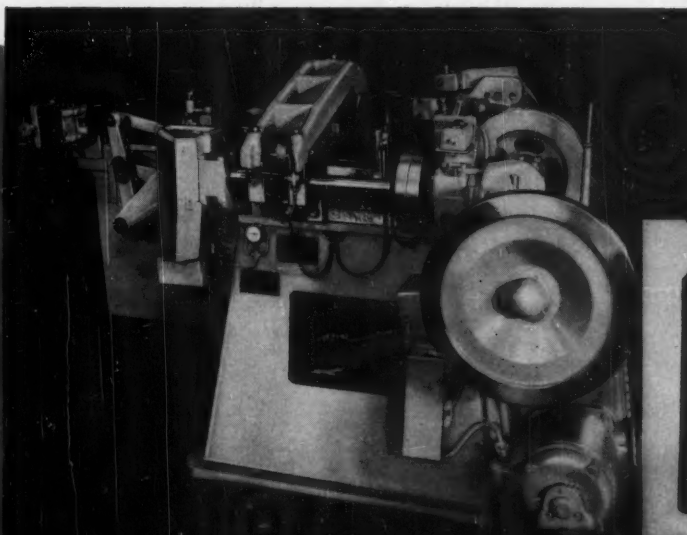
The illustrations on this and the facing page indicate the machines which we will have on display and in operation. This will include two U. S. Multi-Slide Machines and one U. S. Duplex Multi-Miller.

The No. 33 Multi-Slide Machine will produce a formed metal stamping complete including the tapping of a 6/32 hole. The inclusion of the tapping in the Multi-Slide eliminates the need for a secondary operation, increases the versatility of the Multi-Slide, and offers to the user increased potential for cost reduction.

Plan to see this equipment in operation at the Show. In the meantime, send for Bulletin No. 15-M on U. S. Multi-Slides and Bulletin No. 25-M on U. S. Multi-Millers.

U. S. TOOL COMPANY, Inc.

**Ampere (East Orange)
New Jersey**



No. 28 U. S. Multi-Slide



Left: This machine will be in operation at the Show producing the paint brush ferrule as illustrated.

IT'S COST PER CUT THAT COUNTS!

What is the cost of band sawing?

What is the cost of hack sawing?

Let's Find Out in Truth

Many people are currently confused by conflicting claims and so-called "production records" of band saw machine builders and hack saw machine builders; and it is timely that the "air be cleared."

As the **ONLY** American manufacturer who has uninterruptedly built and sold **BOTH** metal-cutting band saw machines and hack sawing machines for more than 37 years, we have decided to boldly "clear the air."

In our Booth No. 416 at the Machine Tool Show, Chicago, September 6th to the 17th, an internationally known firm of test engineers will publicly conduct an unbiased fact-finding test. Under their complete control, a band sawing machine employing high speed steel bands, and a hack sawing machine employing high speed steel hack saw blades will be run continuously on identical work under fixed and rigidly maintained conditions. The result of their unbiased findings, after the conclusion of the test, will be published and distributed to all persons who make request at the Show.

Both the hack saw and band saw machines to be run in this test will be new **MARVEL** models, undergoing their first showing, unquestionably capable of running the blade at the highest speed and the heaviest feed that any saw blade will withstand with reasonable and practical blade life on the test bar selected. The test engineering firm will select the blades to be used from available stock of various brands.

Every precaution will be taken to conduct the test on a strictly unbiased basis. **WE DO NOT CARE** which way this public test may turn the tide, for we, alone, build **BOTH TYPES** of machines — band saws and hack saws. We therefore boldly sponsor this test, seeking **TRUTH**.

Be sure to see it—**BOOTH NO. 416**—The Machine Tool Show.

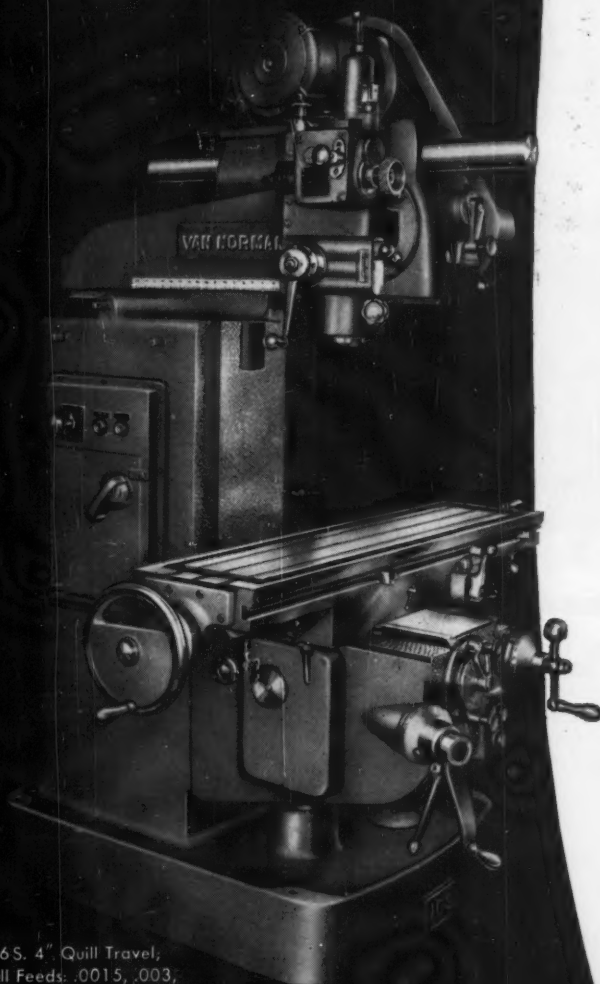
Of course, our full line of **MARVEL SAWS** will also be demonstrated in operation, to the extent that the limited space allowed us will permit. Other machines, not possible to exhibit in our crowded booth will be available for demonstration at our Chicago plant.



ARMSTRONG-BLUM MFG. CO.

5700 West Bloomingdale Avenue • Chicago 39, U.S.A.

For cost cutting production



No. 16S. 4" Quill Travel;
3 Quill Feeds: .0015, .003,
.006 IPM; 8 Spindle Speeds:
110 to 3600 RPM.
Table Size: 40 1/2" x 10"
Cutterhead Motor: 2 HP.

VAN NORMAN COMPANY
SPRINGFIELD 7, MASSACHUSETTS

Manufacturers of — Ram Type Milling Machines, Cylindrical Grinders, Spline and Gear Grinders,
Oscillating Radius Grinders, Special Production Grinders, Centerless Grinders.

**THE SPOTLIGHT
IS ON
VAN NORMAN RAM TYPE
MILLERS AND GRINDERS**



THE NEW No. 16S

with the QUILL adjustable cutterhead

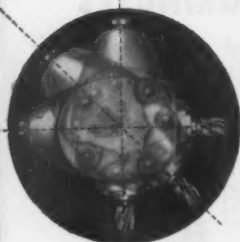
Here's the newest addition to the famous Van Norman line of Ram Type Millers . . . The No. 16S with the exclusive Quill adjustable cutterhead that permits horizontal, angular and vertical milling *plus* boring and drilling on ONE machine without attachments.

Entirely new from top to bottom, it is designed and engineered for maximum rigidity, cutability and accuracy. It offers users greater opportunities to increase production and reduce costs in the tool room, machine shop, pattern shop and production line.

The Van Norman 16S is truly the outstanding milling machine available, today. Get the full facts, now.



ONE Van Norman Ram Type Miller does the work of TWO single purpose machines

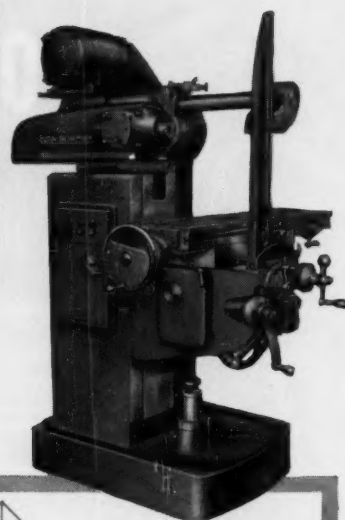
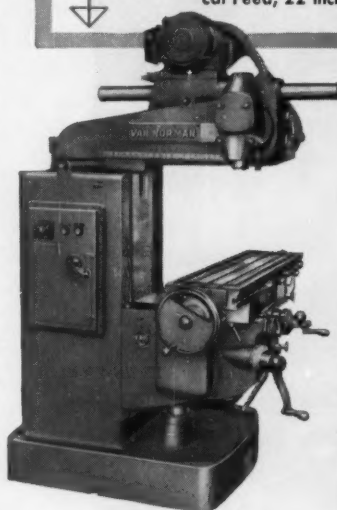


Horizontal, Angular or Vertical Milling are at your fingertips with ONE Van Norman Ram Type Miller.

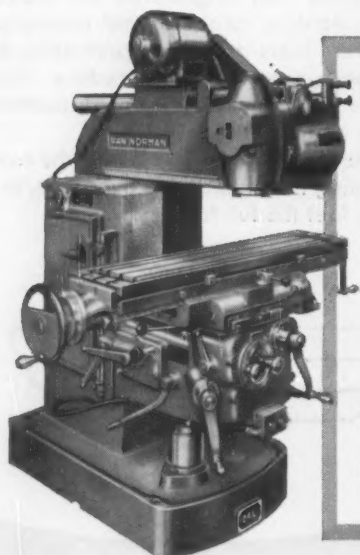
A single investment in one Van Norman Ram-Type Milling Machine gives you the equivalent of two separate millers plus attachments at the much lower cost of a single machine. Not only do you save machine purchase dollars, but with a Van Norman you get increased production with substantial savings in milling costs.

14 new standard models with cutterhead motors ranging from 2 HP to 10 HP and table sizes from 40½" x 10" to 64" x 14" give you a wide range of selection. Write for individual catalogs giving complete information.

No. 16L — Plain or Universal
2 HP Cutterhead Motor; Size of Table, 40½ inches x 10 inches; Ram Travel, 20½ inches; Power Longitudinal Feed, 22 inches; Hand Cross Feed, 10 inches; Hand Vertical Feed, 22 inches.

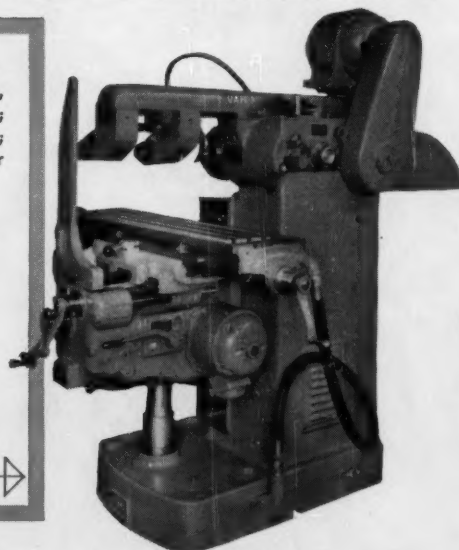


No. 16M — Plain or Universal
3 HP Cutterhead Motor; Size of Table, 40½ inches x 10 inches; Ram Travel, 20½ inches; Power Longitudinal Feed, 22 inches; Hand Cross Feed, 10 inches; Hand Vertical Feed, 22 inches.



No. 24L — Plain or Universal
3 HP Cutterhead Motor; Size of Table, 45 x 10½ inches; Ram Travel, 29 inches; Power Longitudinal Feed, 28 inches; Power Cross Feed, 12 inches; Power Vertical Feed, 18 inches.

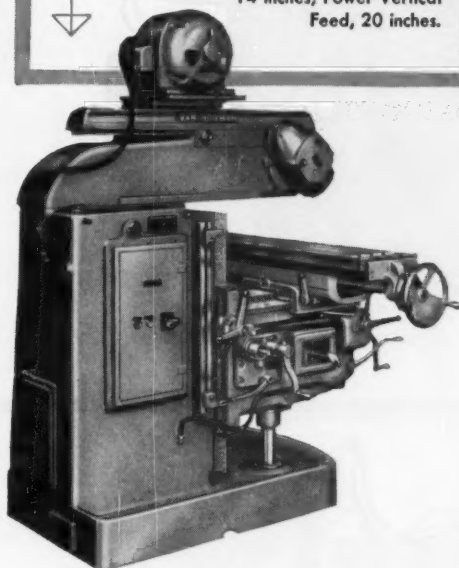
No. 24M — Plain or Universal
5 HP Cutterhead Motor; Size of Table, 50 x 12 inches; Ram Travel, 25 inches; Power Longitudinal Feed, 28 inches; Power Cross Feed, 12 inches; Power Vertical Feed, 20 inches.



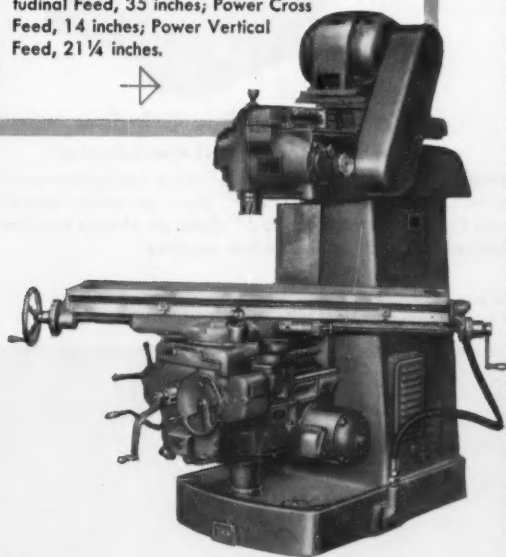
VAN NORMAN COMPANY

Manufacturers of — Ram Type Milling Machines, Cylindrical Grinders, Spline and Gear Grinders, Oscillating Radius Grinders, Special Production Grinders, Centerless Grinders.

No. 28 — Plain or Universal
 7½ HP Cutterhead Motor; Size of Table, 58 x 13
 inches; Ram Travel, 29 inches; Power Longi-
 tudinal Feed, 28 inches; Power Cross Feed,
 14 inches; Power Vertical
 Feed, 20 inches.



No. 38M — Plain or Universal
 10 HP Cutterhead Motor; Size of Table, 64 x 14
 inches; Ram Travel, 29 inches; Power Longi-
 tudinal Feed, 35 inches; Power Cross
 Feed, 14 inches; Power Vertical
 Feed, 21 ¼ inches.



SPRINGFIELD 7, MASSACHUSETTS

Van Norman Grinders

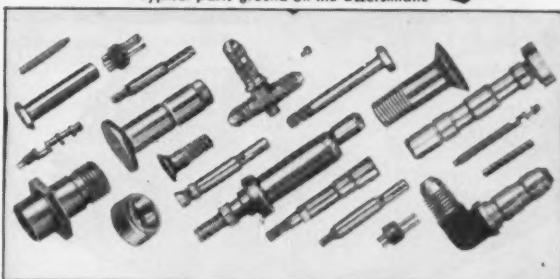
The Van Norman line of grinders includes the famous Radius Grinders, which since 1912 have been the "standard" for grinding ball races, Centerless Grinders, Cylindrical Grinders, Mass Production Grinders and Spline and Gear Grinders. Each is designed for rigidity and accuracy.

Diversimatic® Centerless Grinders

It finish-grinds small parts from solid and rough-turned pieces. Can be equipped with crush dresser to grind multi-diameter and contoured parts from solid. Work size up to 1 ½". Grinding wheel 14" x 4" wide. Hydraulic straight-profile wheel dressers standard equipment. Automatic cycle and loading optional.



Typical parts ground on the Diversimatic



No. 41B Plain Cylindrical Grinder

Especially applicable for fast, economical grinding. "Auto-Cycle" infeed attachment provides completely automatic cycle for plunge grinding (optional). Work size 4" diam. x 18" long. Grinding wheel 14" O.D. x 2" wide. 2 HP wheel motor standard; 3 HP optional.



Van Norman Special Mass Production Grinders

Van Norman Production Grinders are rugged, heavy duty machines engineered and built to assure maximum grinding accuracy at high production rates. They are designed with single or double head grinding units to meet specific requirements, with automatic sizing and wheel dressing.

Single-Head Plunge Cut Grinder

For straight and formed grinding; grinding wheel capacity: 30" x 20" x 6"; weight 19,600 lbs.



Double-Head Plunge Cut Grinder

For grinding multiple diameters and opposing faces; grinding wheel capacity: two wheels; 30" x 20" x 6"; weight 28,400 lbs.



Oscillating Radius Grinders

(Internal, External, Thrust and Spherical)

Internal: Capacities from $\frac{3}{8}$ " to 18" diam. on various machines
External: Capacities from 0" to 7" diam. on various machines
Thrust: Capacities from $\frac{1}{2}$ " to 5" diam. on various machines
Spherical: Up to 5" radius on one machine

Van Norman Machines are available on five purchase plans — Outright sale . . . Purchase on conditional sales contract up to 5 years . . . Pay as you depreciate . . . Straight Lease . . . Lease with option to buy. See your dealer or write Van Norman Company. Lease and Conditional Sales Contracts not available to Export.

VAN NORMAN COMPANY

SPRINGFIELD 7,
MASSACHUSETTS

Manufacturers of — Ram Type Milling Machines, Cylindrical Grinders, Spline and Gear Grinders,
Oscillating Radius Grinders, Special Production Grinders, Centerless Grinders.

You'll see Federal Automation Gages operating on many machine tools at the Show*. Don't miss these latest developments in automatic dimensional control.

*Since we manufacture Gaging Equipment only, and the Show is restricted to Machine Tool Builders, we will not have a booth of our own at the Show.

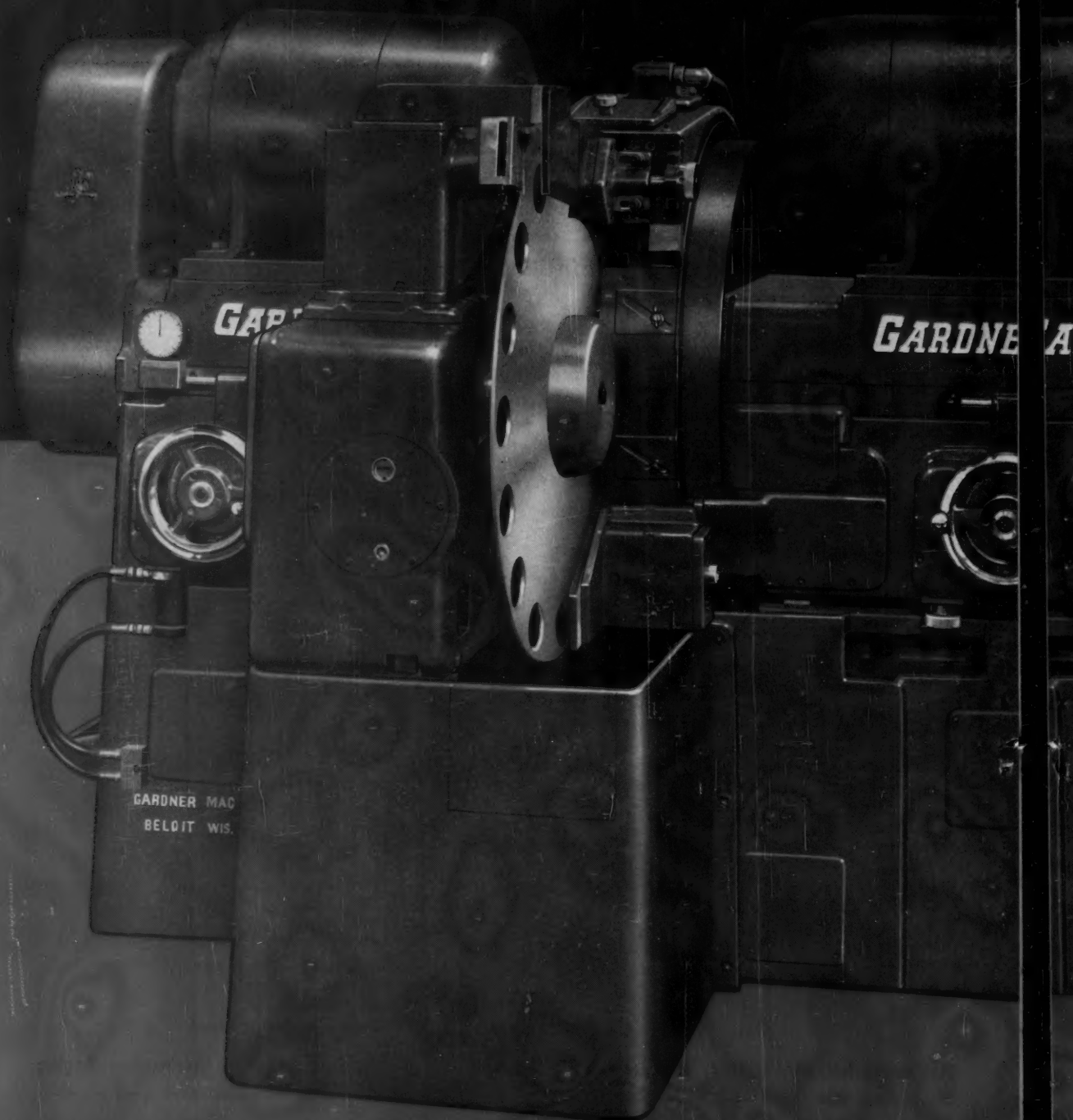
Also—Please turn to page 351. You'll see some of Federal's most modern Automatic, Air and Mechanical Gages—and how they are used.

Ask **FEDERAL**
FOR ANYTHING IN MODERN GAGES...

Federal Products Corporation
Dept. 3E Providence 1, Rhode Island

Dial Indicating, Air, Electric, or Electronic — for Inspecting, Measuring, Sorting, or Automation Gaging

NEW ***GARDNER***
double spindle

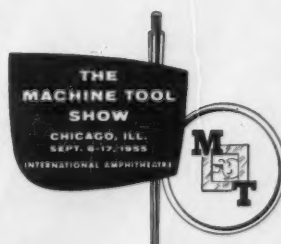


grinder

**New 2H30 engineered
for higher production —
greater precision**

- **NEW** Rigid Spindle Design
- **NEW** Massive Bed Construction
- **NEW** Precision Feed of Discs
- **NEW** Accurate Dressing Mechanism
- **NEW** Convenience of Setup and Operation

grinds **TWO** parallel surfaces
in **ONE** operation



In operation at Booth 1115

GARDNER

precision disc grinders

BELOIT, WISCONSIN

WINTER TAPS HAVE **BALANCED** *Action*

To lower your cost of tapped holes, put Winter **BALANCED ACTION** Taps to work for you. ALL have uniform flute contours; exact flute spacing; accurate and concentric chamfers; and precision chip driver contours.

WINTER BROTHERS COMPANY

Rochester, Michigan, U.S.A. Distributors in principal cities. Branches in New York • Detroit • Cleveland • Chicago • Dallas • San Francisco • Los Angeles
Division of National Twist Drill & Tool Co.



CALL YOUR WINTER DISTRIBUTOR

WINTER GAGES Are Now Available

from your Winter distributor.
These gages are made with **BALANCED ACTION** thoroughness.
Catalog on request.





National



The Cutting Tools That Give You The Edge

You depend on the cutting edge of the tool to give you long hours of dependable service. Nationals hold their cutting edges. They keep your grinding room costs at a minimum too.

NATIONAL TWIST DRILL AND TOOL COMPANY

Rochester, Michigan, U.S.A. Distributors in principal cities. Branches in New York • Detroit • Cleveland • Chicago • Dallas • San Francisco • Los Angeles

Now Available With CARBIDE TIPS:

National Twist Drills, Reamers, End Mills, Milling Cutters, Counterbores.



CALL YOUR NATIONAL DISTRIBUTOR

Twist Drills • Reamers • Counterbores • Milling Cutters • End Mills • Hobs • Carbide Tipped and Special Tools

The story of the fastest known
method for milling the flat
surfaces of repetitive pieces ...

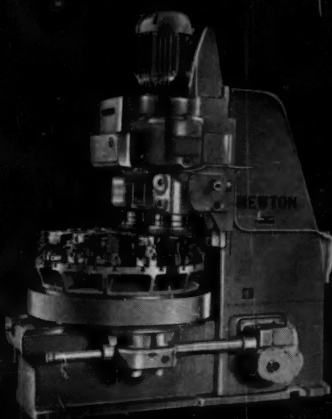
Here's the story..

40 interesting and informative
pages on Newton Vertical
Rotary Milling Machines that
can lead to important savings
even on short runs.

CONSOLIDATED MACHINE TOOL



A DIVISION OF FARREL-BIRMINGHAM CO., INC.



N V R

Newton Vertical Rotaries

BULLETIN 651
CONSOLIDATED MACHINE TOOL COMPANY
 ROCHESTER, NEW YORK
 A DIVISION OF FARREL-BIRMINGHAM CO., INC.

COMPANY ROCHESTER 10, N. Y.

CONSOLIDATED MACHINE TOOL COMPANY
 565 Blossom Road, Rochester 10, N. Y. M-95

Please send me without obligation your new Bulletin 651 giving the full story on Newton Vertical Rotary Milling Machines.

Name.....
 Title.....
 Firm Name.....
 Address.....
 City..... Zone..... State.....

KEARNEY & TRECKER

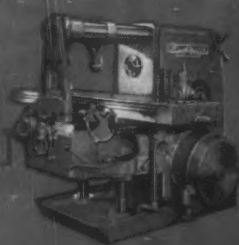
expansion and new

See these outstanding machines in Booth 508

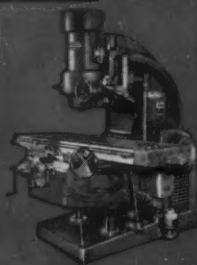
- ★ **New TK Series Milling Machines** — incomparably modern titans of general purpose production!
- ★ **New TF Series Milling Machine** — strikingly new models featuring remarkable twin-screw knee support.
- ★ **New Model CE Milling Machines** — the simplified, precision-built, economy producer for schools, maintenance and small tool work.
- ★ **New Ram Head Milling Machines** — versatile performers featuring combination arrangements of horizontal, vertical and universal spindles.
- ★ **New Mil-Waukee-Mil Series Milling Machines** — flexible, power laden, broad capacity, bed-type production tools.
- ★ **New Automatic Precision Boring Machines** — superb vertical models introducing a non-wearing twin-screw measuring system.
- ★ **New Automatic Transfer Machines** — Quill Feed unit, Way-Type Drilling unit, Lead Screw Tapping unit, Rotary Index Table, Feed Slide.
- ★ **New Compudex** — the precision indexing computer for rotary tables and dividing heads.
- ★ **New Tri-D Rotary Milling Head** — the amazing attachment which will produce almost any geometric shape in metal.



This scale model of Kearney & Trecker Machine Tool Show Exhibit represents 6500 sq. ft. of modern machine tools in action.



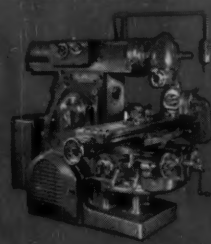
NEW TK SERIES Milling Machines — Available in four sizes Plain and Vertical styles. . . . power from 30hp to 50hp.



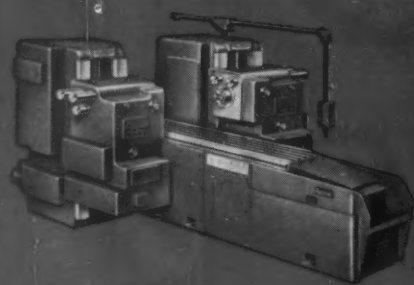
NEW TF SERIES Milling Machines — Available in five sizes Plain, Universal and Vertical styles from 10hp to 30hp.



NEW MODEL CE Milling Machines — Available in either 3hp No. 2 or 7 1/2hp No. 3 size, both in Plain and Universal styles.



NEW RAM HEAD Milling Machines — Built in 21 different machine sizes and styles from No. 2 to No. 4, Plain and Universal.



NEW MIL-WAUKEE-MIL Production Milling Machines — over 300 combinations available in Simplex and Duplex styles.



NEW MODEL C AUTOMATIC Vertical Precision Boring Machines — Two sizes, No. 3 and No. 4. Also available in horizontal style, No. 2.



NEW TRI-D MILLING HEAD — Plain, rotary and angular milling made easy. Adaptable to almost any make of horizontal and some vertical milling machines.

unfolds results of \$18,700,000 product development program

An extraordinary investment to bring you MORE PRODUCTIVITY and QUALITY . . . GREATER ECONOMY and PERFORMANCE in the new machine tools you buy from KEARNEY & TRECKER

Yes, the 1955 Kearney & Trecker Machine Tool Show story reflects a tremendous investment any way you look at it—\$3,500,000 in new buildings and facilities; \$8,900,000 in new tools and equipment; \$6,300,000 in research and new product development.

And at the Show you'll see the positive results of this unprecedented eight-year growth and development program. You'll see 31 unusual exhibits featuring among them not one, but four new lines of knee-type milling machines comprising 81 different models, styles and sizes; an entirely new line of medium size bed-type production milling machines with electro-hydraulic pendant control; a new group of vertical precision boring machines; new attachments for rotary

milling and precision index computing; automatic transfer type equipment — all of this and more to be seen and demonstrated in Booth 508.

Today, Kearney & Trecker offers you standard and special production machines that can meet any of your needs — with more productivity and quality, with greater economy and performance than ever before. What's more, you can obtain new machines either by outright purchase, conditional sales agreement or any of three Kearney & Trecker Tool-Lease plans.

See or write your nearest Kearney & Trecker representative. He'll be glad to discuss your production requirements and what these new Kearney & Trecker machines can do to meet them.



NEW 12-STATION AUTOMATIC TRANSFER MACHINE — It mills, drills, reams, taps, spotfaces and saws apart integrally—meets bearing cap blocks at production rate of 72 sets per hour.



NEW GANTRY-TYPE WING SKIN TRACER-CONTROLLED MILLING MACHINE — A 125-ton, 360° and rise and fall functioning giant of production, which is typical of recent Kearney & Trecker developments for the aircraft industry. Similar machines can be seen in operation at Kearney & Trecker's new Special Machinery Division plant in Milwaukee during the Show.



BUILDERS OF PRECISION AND PRODUCTION MACHINE TOOLS SINCE 1898

metalworking history will be made by

NIAGARA PRESSES, PRESS BRAKES

in action!

Watch them operate. Examine them. See a revolution in metalworking with these modern wonders in action. You'll be electrified by brand new machines never before exhibited, stirring new developments on conventional machines and engineering marvels in press automation.

Truly, Niagara promises you the greatest demonstration of the word "New" in the whole Machine Tool Show.

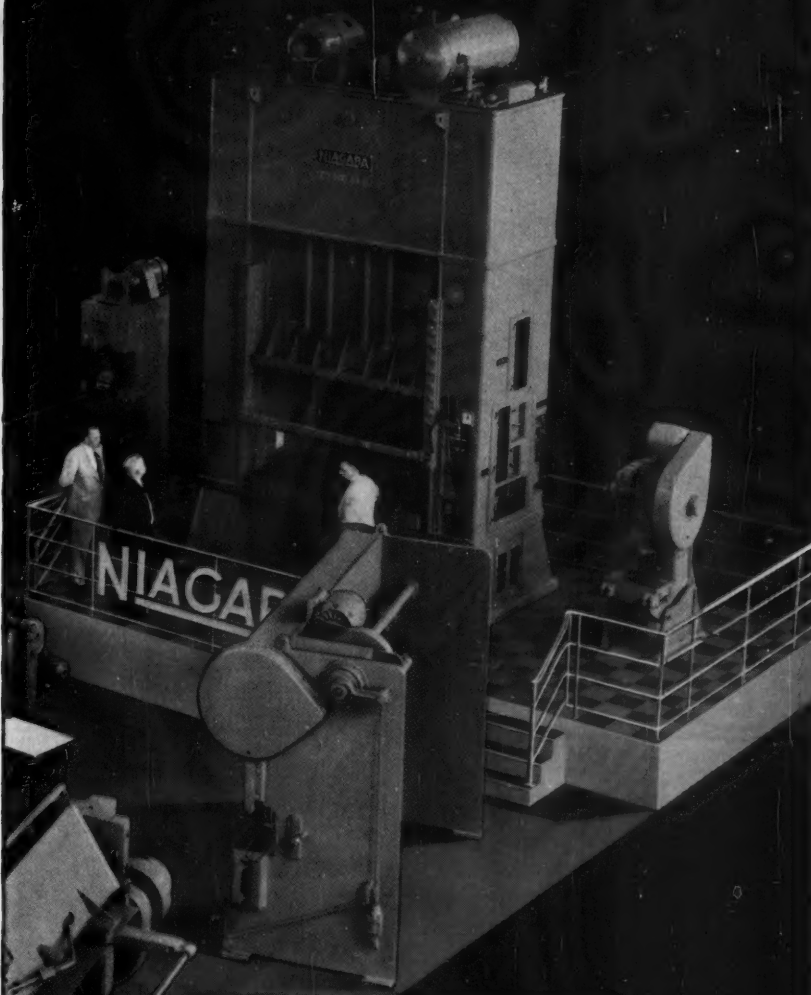
And everybody — yes, everybody — top management and all — will be on hand to give you a warm greeting and a full explanation of anything you wish to know about history-making Niagara machines. Come early, while you're fresh. There's so much to see!

NIAGARA MACHINE & TOOL WORKS • BUFFALO 11, N. Y.



NIAGARA

AND SHEARS



MAIN EVENT
Booth No. 715

**THE
MACHINE TOOL
SHOW**
CHICAGO, ILL.
SEPT. 8-17, 1955
INTERNATIONAL AMPHITHEATRE



NEW DESIGNS

NEW LINES

NEW COMPACTNESS

NEW STAMINA

NEW ECONOMIES

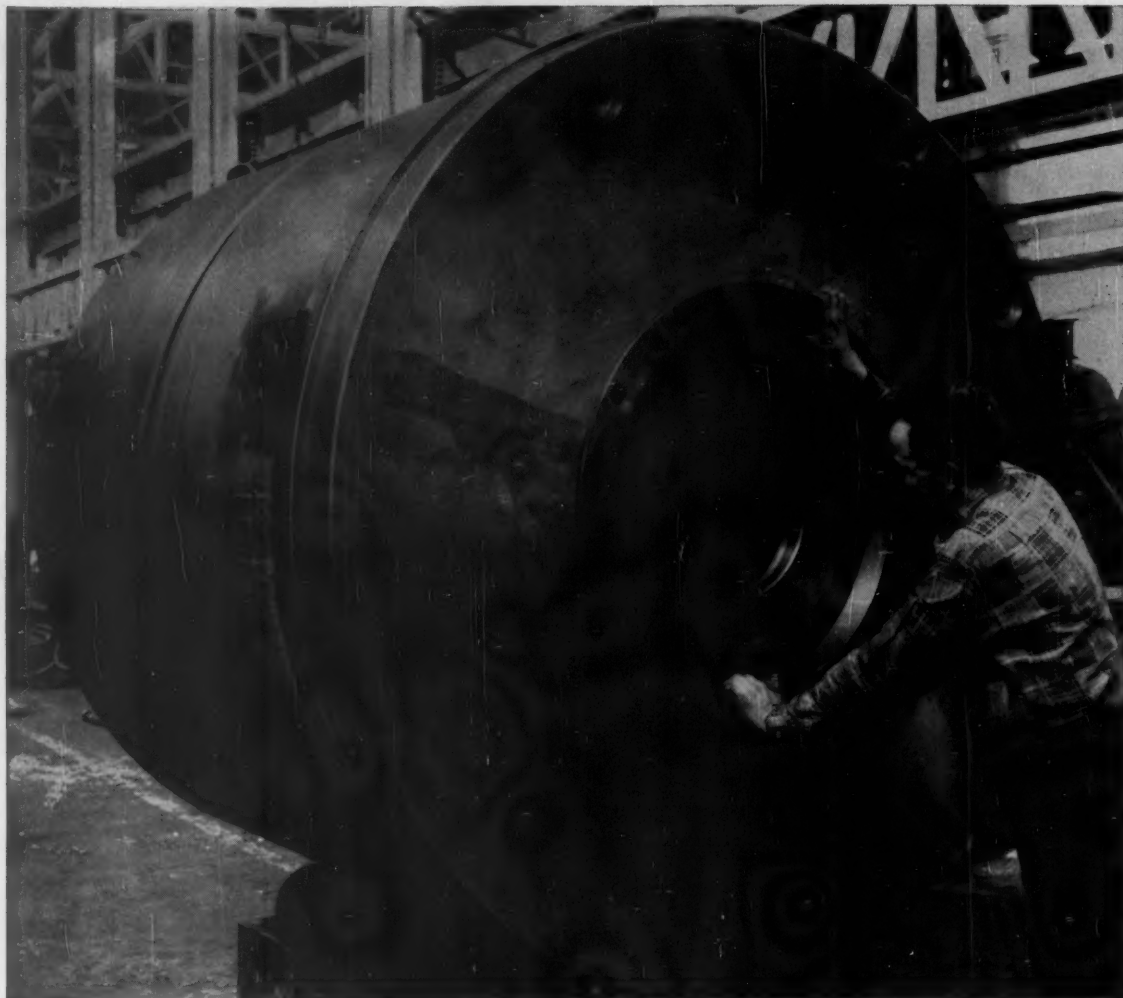
NEW ACCURACY

NEW OPERATING EASE

NEW SAFETY

NEW CAPACITIES

NEW PRODUCTIVITY



High-Pressure Container has 30-in. Wall

This is a billet-container assembly for a 12,000-ton extrusion press. There is a lot more to it than a casual glance would reveal. Though short and squat, it weighs almost 44 tons. The OD is 76 in., the honed ID slightly more than 16 in. Thus the wall surrounding the axial hole is just about 30 in. thick at every point. And the thickness is needed... to fully withstand the terrific pressures created during extruding work.

Actually, the body of this husky container is built in layers. The outer layer consists of two large forged rings, side by side. Next comes a heavy forged sleeve. The innermost layer, or liner, is also a forging. Outer rings and sleeve are of chromium-vanadium-molybdenum steel. The liner is made of chromium-vanadium-molybdenum-tungsten hot-work steel.

Bethlehem built the container for Loewy-Hydro-press, noted designer of heavy mechanical equipment. This is one of the several important jobs entrusted by Loewy engineers to Bethlehem forge and machine shops. We have the facilities to handle such jobs—from the making of the steel to the final steps of assembly.

But please remember, too, that Bethlehem is just as interested in smaller types of work. Though our shops are equipped to produce and machine the largest forgings ever required, we also make many so small you can hold them on a fingertip.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL





COLD FACTS about the HOTTEST IDEA in the history of coolants...

- 1 CIMCOOL® Concentrate has become, in just a few years, the largest selling chemical cutting fluid in the world.
- 2 CIMCOOL LOWERS COSTS because it's longer lasting in machines. Thus, it reduces downtime and cuts labor costs for cleaning and changing.
- 3 CIMCOOL DOES A BETTER JOB because of its chemical lubricity. It permits faster speeds and increases tool life, for it combines friction reduction and cooling capacity in a degree never before attained.

We'll be happy to supply information on the many specific advantages of CIMCOOL Concentrate—or details on the entire family of CIMCOOL Cutting Fluids. Just contact us and we'll have one of our Cincinnati Milling-trained machinists call on you—without cost or obligation. Wire, write, or telephone Sales Manager, Cincinnati Milling Products Division, The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.

*Trade Mark Reg. U.S. Pat. Off.

CIMCOOL CUTTING FLUIDS

CIMCOOL Concentrate—The famous pink fluid which still covers 85% of all metal cutting jobs. Effective, economical and clean.

CIMCOOL Tapping Compound—Permits the use of highest tapping speeds and increases tap life amazingly.

CIMPLUS The transparent grinding fluid with exceptional rust control. Also used for machining cast iron and as a water conditioner with CIMCOOL Concentrate.

CIMCUT Base Additive—For jobs requiring an oil-base cutting fluid. Added to mineral oils, it gives an economical mix for higher speeds and feeds.

CIMCOOL Bactericide—The most effective agent yet developed to overcome rancidity.

CIMCOOL Machine Cleaner—The two-phase non-corrosive cleaner that removes grit, dirt, slime and oil.

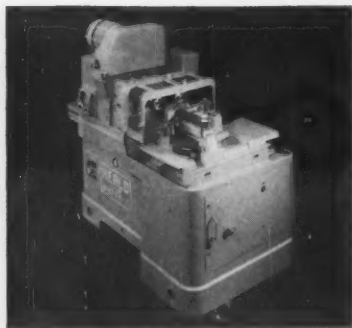
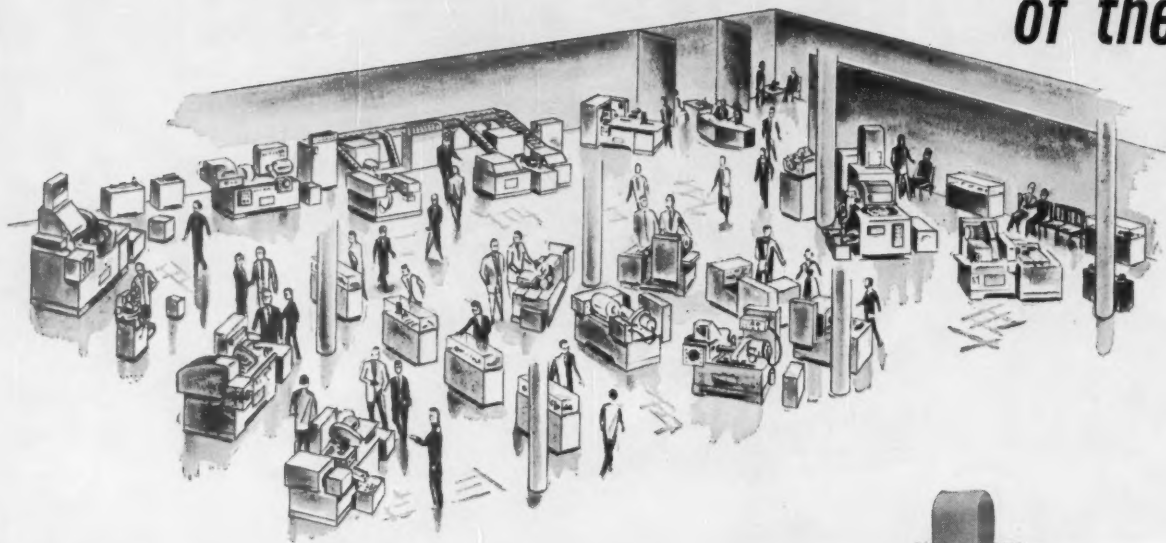
CIMCOOL

Cutting Fluids

for 100% of all metal cutting jobs

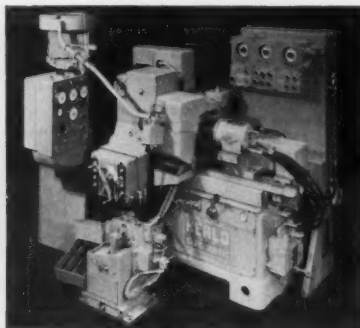
PRODUCTION-PROVED PRODUCTS OF THE CINCINNATI MILLING MACHINE CO.

HEALD *presents seven* *of the*



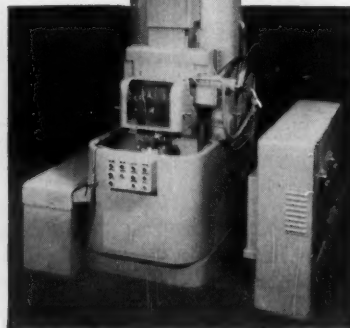
*** Model 2 Cam-Operated Bore-Matic**

All-mechanical cam operation makes its debut as an alternate to the hydraulic system on a high-precision Heald Bore-Matic. This new machine, for handling small to medium-size work, demonstrates high productivity by finishing all surfaces of gear blanks in a single, high-speed, fully automatic cycle. Entire cam unit swings out of base for easy access or replacement of cams. Bulletin 2-2215-1.



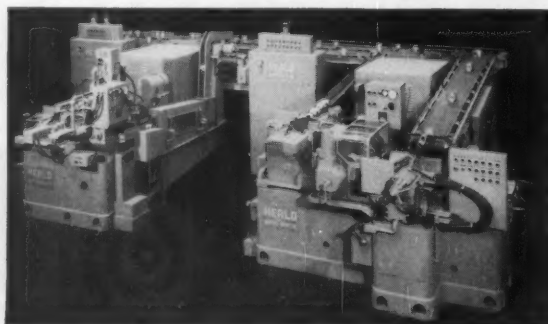
*** Model 170 Size-Matic**

A high-production, auto-chucking, internal grinding machine with hopper feed and automatic after-gaging and feedback. New feedback system transmits gaging results back to the new rotary diamond unit, automatically compensating for any in-cycle deviations from required tolerance. Provision for automatic sorting also included. Bulletin 2-170-1.



*** Model S Vertical Bore-Matic**

Vertical arrangement of tool-slide unit conserves floor space and facilitates loading and clamping of work in a horizontal position. Multiple slide units, approaching work from various directions, can be supplied as required for a particular type of work, and either work or tooling can be rotated. Ideally suited to automated production set-ups. Bulletin 2-25-3.



*** Automated Slide Unit Bore-Matic**

A completely automated set-up of two individual machines with automatic conveying, orienting, locating, clamping, boring, unloading, flushing, gaging and sorting. Machine is arranged for continuous production of automotive pistons, boring pin holes and elliptical box turning in sequential operations at the two stations. Bulletin 2-25-3.

new stars **Machine Tool Show**

**...with a supporting cast of
important new developments in precision finishing**

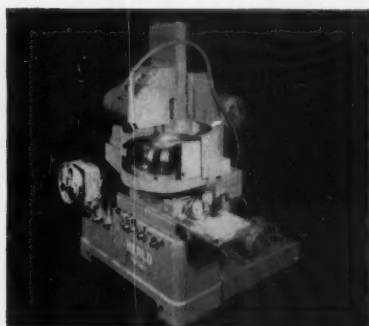
The sixteen Heald machines on display in Booth 902 at the N.M.T.B.A. Show represent the very latest advances in modern precision-finishing methods and equipment.

The seven machines shown below are *completely new* in basic design or important functional details. Hence they are, in effect, the "stars" of the Heald exhibit.

The other Show machines however, also demonstrate *important new developments* that will contribute materially to higher precision and faster, better production. Included are new and more effective

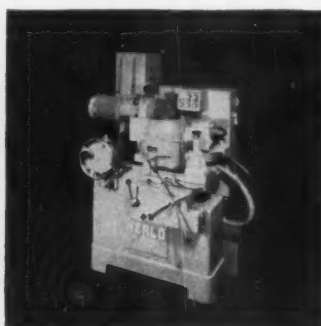
sizing methods for internal grinding—self-adjusting cycles—automatic after-gaging and sorting—new Feed-Out quills—new workholding methods on Centri-Matic machines—skip compensation and dressing—simultaneous bore and face grinding—plus many new applications of standard or semi-standard machines.

If you were unable to get to the Show; be sure to have your Heald representative bring you up-to-date on these latest developments. Full details on the new machines shown below can be obtained by sending for the Bulletins listed.



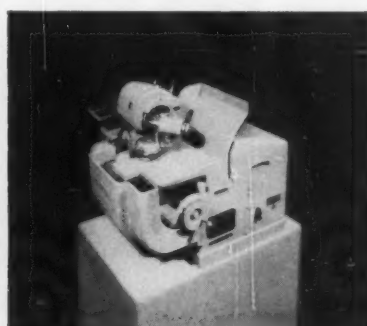
*** Model 361 Rotary Surface Grinder**

New "king size" column-type rotary for high-precision surface grinding of larger work than could heretofore be handled on a standard Heald machine. Features and construction details essentially same as Model 261 Rotary, with modifications to accommodate a 24" chuck and 17½" vertical capacity from top of chuck to center of wheel. Wheelhead drive motor is mounted on vertical column equipped with plain bearing slide. Bulletin 2-361-1.



*** Model 161 Rotary Surface Grinder**

Completely new column rotary, mechanically operated and designed for maximum precision and economy in grinding relatively small parts. New mechanical load and fire type reversal simplifies construction and reduces servicing requirements. With a 6" chuck and 10" vertical clearance to center of wheel, it offers full flexibility for a wide variety of parts within its size range. Bulletin 2-161-1.



*** Model 3 Tool Sharpening Machine**

A new model incorporating advanced design features for faster, easier sharpening of carbide tipped cutting tools. Permits precision duplication of any desired tool shape for optimum cutting efficiency and maximum tool life. Includes positive drive reciprocation and more effective enclosed mechanical operating unit for spindle and tool holder drive. Bulletin 2-4-2.

*Now, more than ever before,
it PAYS to come to Heald*

THE HEALD MACHINE COMPANY
Worcester 6, Massachusetts

Branch Offices: Chicago • Cleveland • Dayton • Detroit • Indianapolis • New York



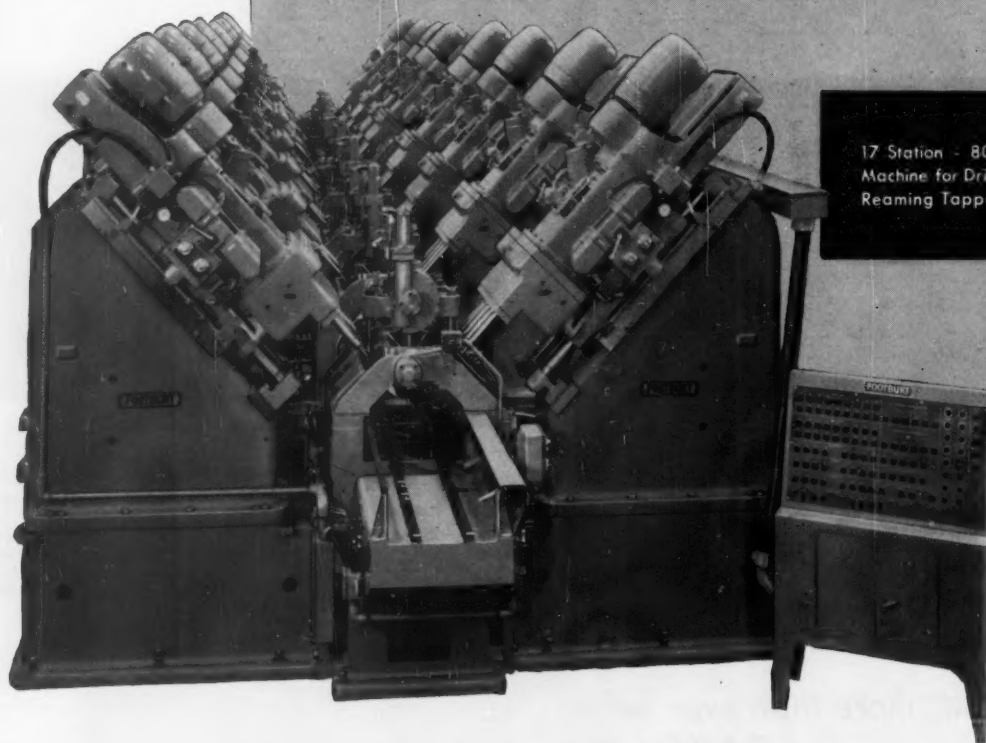
FOOTBURT

STATION TYPE MACHINES

Production-wide engineers in leading automotive plants are specifying Footburt Station Type Equipment on cylinder blocks and cylinder heads as the most advanced method in quantity manufacturing. Similar operations that ordinarily require several separate machines are grouped in one station machine, thus greatly reducing handling and providing better production control. Combining of valve hole operations, cylinder boring, the majority of drilling and tapping operations are outstanding examples of this latest production trend.

THE FOOTE-BURT COMPANY • Cleveland 8, Ohio

Detroit Office: General Motors Building



17 Station - 80 Spindle
Machine for Drilling and
Reaming Tappet Holes.

*★engineered
for
production*

FOOTBURT

M A C H I N E T O O L S

**Automated production line
for precision grinding by**

BRYANT

GARDNER

LANDIS

see them in operation at the

Machine Tool Show

Sept. 6-17th, 1955 International Amphitheatre, Chicago

Bryant Internal Grinder



automatic
unload
automatic
gaging
of races



automatic internal
grinding of race-way

elevator to
automatic
loader

BRYANT

precision internal grinders

La

Landis Concentric Grinder



automatic
loading
of inner
bearing races



automatic grinding
of race-way



automatic
gaging

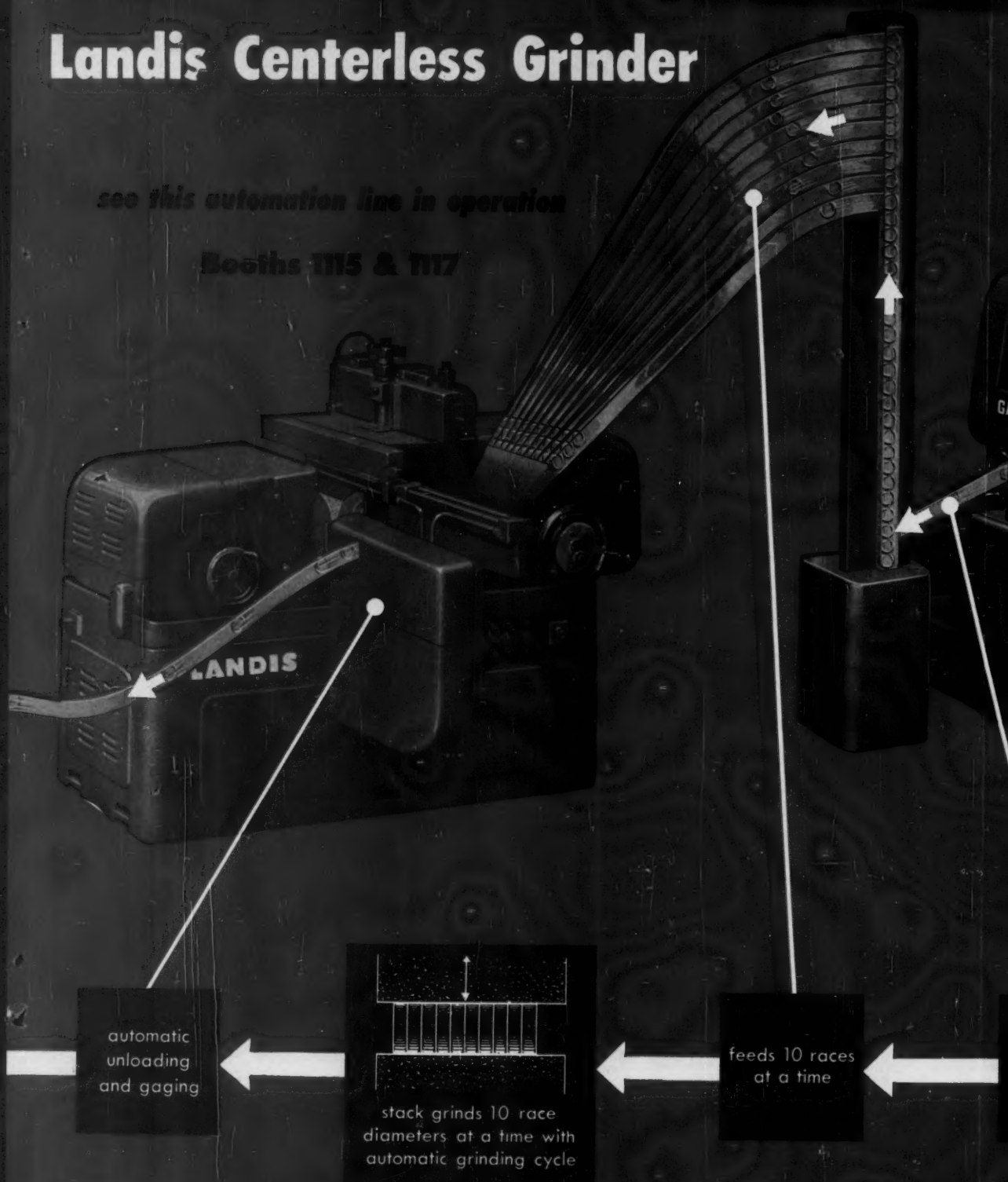
LANDIS

precision grinders

Landis Centerless Grinder

see this automation line in operation

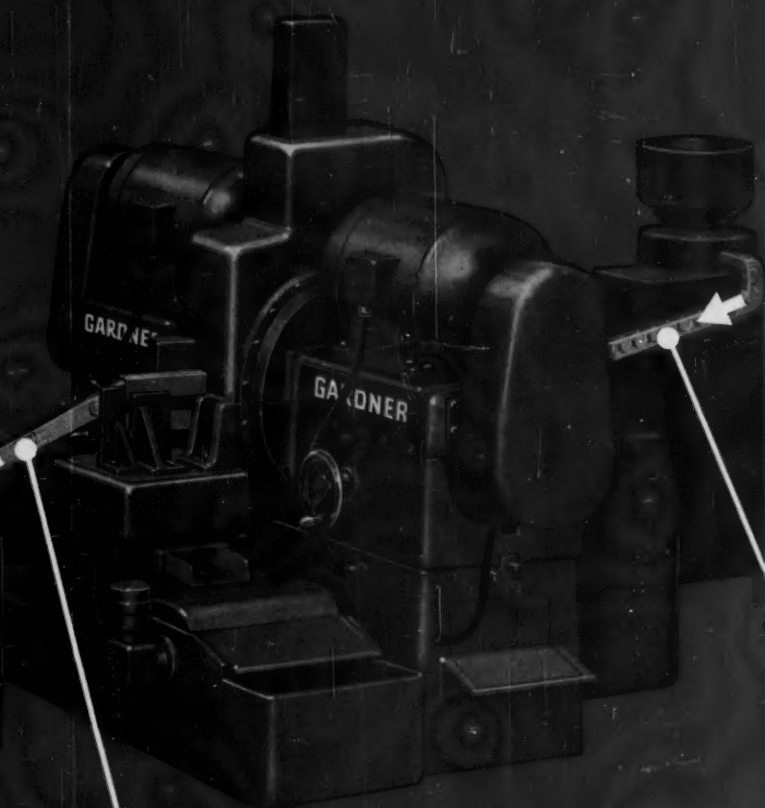
Booths T115 & T117



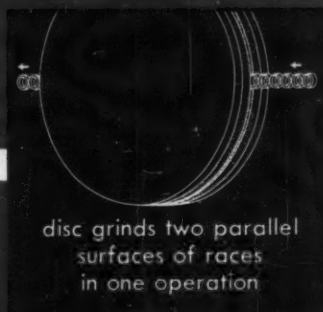
LANDIS

precision grinders

Gardner Double Disc Grinder



discharges
to elevator



automatic
loading of
bearing races

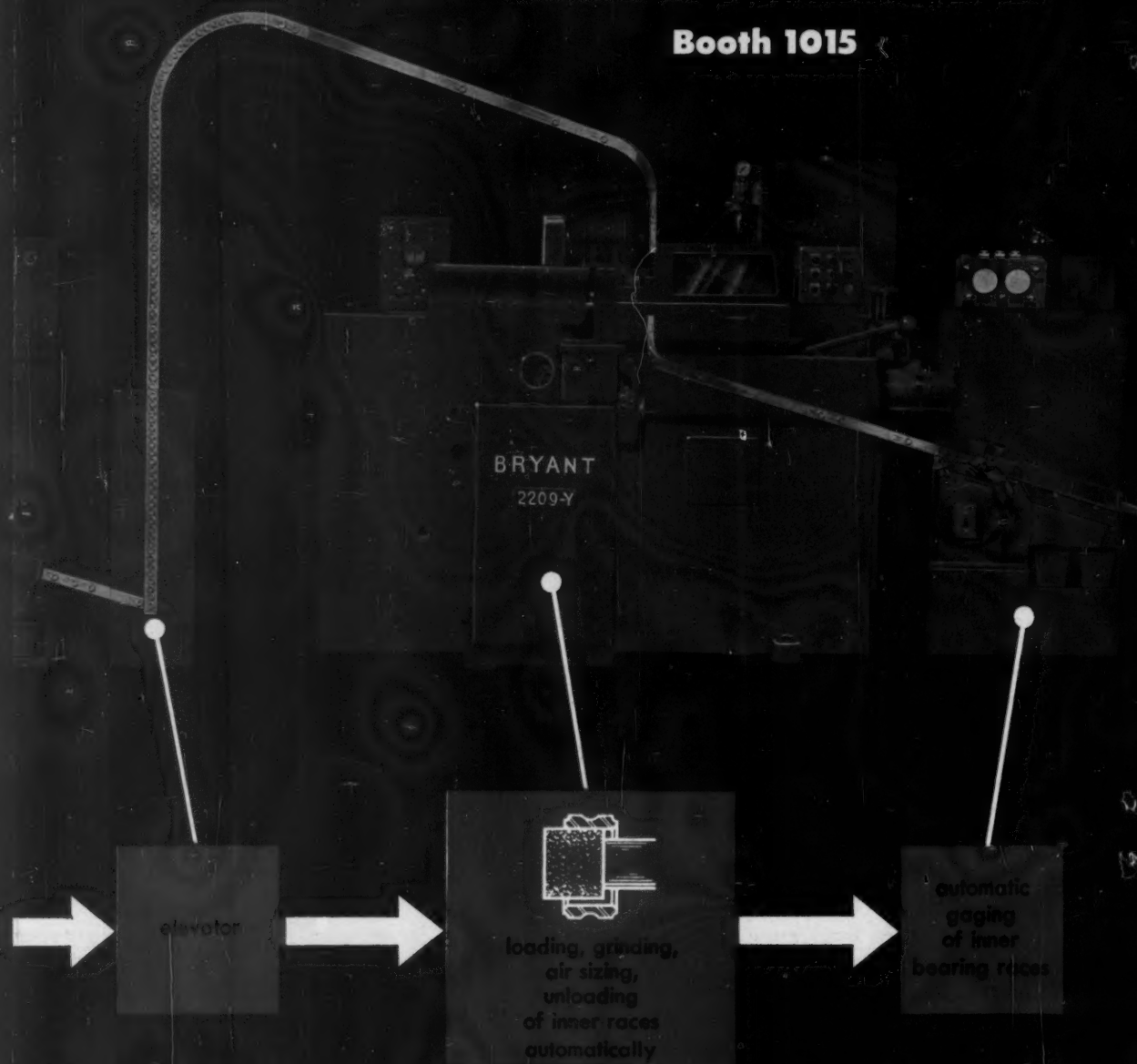
GARDNER

precision disc grinders

Bryant Internal Grinder

see this automation line in operation

Booth 1015



BRYANT

precision internal grinders

Now

...an all electric completely
self-contained lead screw tapping
unit that needs no reversing motor



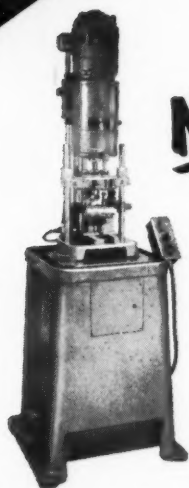
New

ETTCO-EMRICK A.T.U. No. 3 with forward and reverse electric clutches

Fastest, most accurate and simplest method of lead screw tapping yet devised! The Ettco-Emrick A.T.U. No. 3 Unit utilizes a new principle of instantaneous acting electromagnetic forward and reverse clutches. Makes tapping as easy and as automatic as it could possibly be.

In addition to single spindle operation, basic A.T.U. Units can be incorporated into a variety of tapping set-ups using Ettco-Emrick fixed or adjustable spindle multiple heads, work holding fixtures, etc. to meet an almost limitless range of tapping and threading requirements.

Bulletin No. A.T.U. has details. Send for a copy.



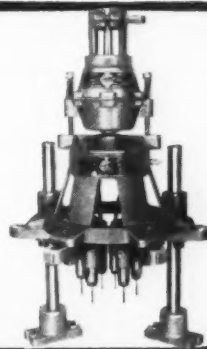
A.T.U. Lead Screw Tapping Machine
—the ultimate in speed and economy

SEE THEM
IN OPERATION
at the
PRODUCTION
ENGINEERING SHOW

Booth 527
Navy Pier
Sept. 6-17

... this new Flex-Shaft Spindle Multiple Head drills or taps millions of hole combinations

Exclusive flex-shaft spindle design provides greater versatility — faster, easier set-ups. Handles an unlimited variety of drilling and tapping jobs. Three different models — straight line and circle types. Can be used on any drill press. A real time-and-money-saver that's worth checking into. BULLETIN 600A has details. Write.



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Distributors throughout the U.S. and Canada

TAPPING ATTACHMENTS • MULTIPLE HEADS • TAPPING MACHINES • INDEXING FIXTURES • TAP AND DRILL CHUCKS

For more information on products advertised, use Inquiry Card, page 325

MACHINERY, September, 1955—33

Be sure to see
today's **MOST MODERN**
line of **MACHINE TOOLS**



You haven't really "Seen the Show"
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for here are displayed not merely re-designed
but completely new machines that take
full advantage of modern technological advances
including single station Pendant Control.

Don't Miss It!

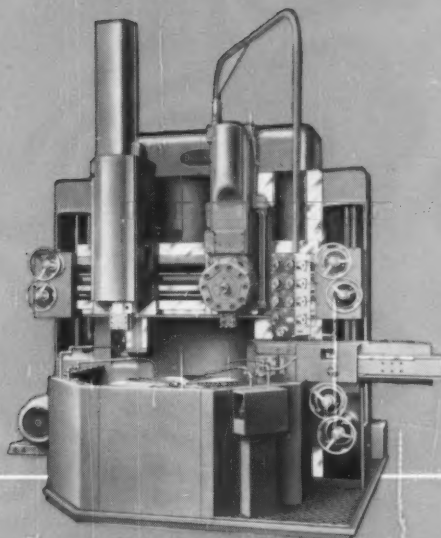


The Bullard Co.

Bridgeport 2, Connecticut

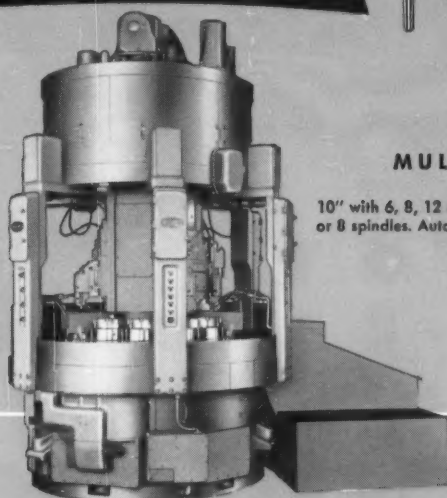
at
**BOOTH
1213**

**THE
MACHINE TOOL
SHOW**
CHICAGO, ILL.
SEPT. 8-12, 1955
INTERNATIONAL AMPHITHEATRE



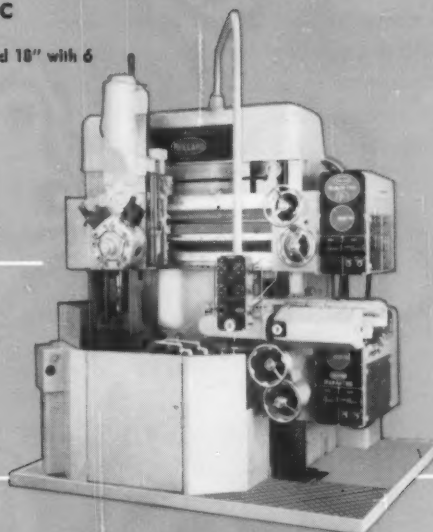
CUT MASTER V.T.L.
Model 75

In six sizes, 26" to 76" table diameters in 10" increments. Various combinations of heads are available.



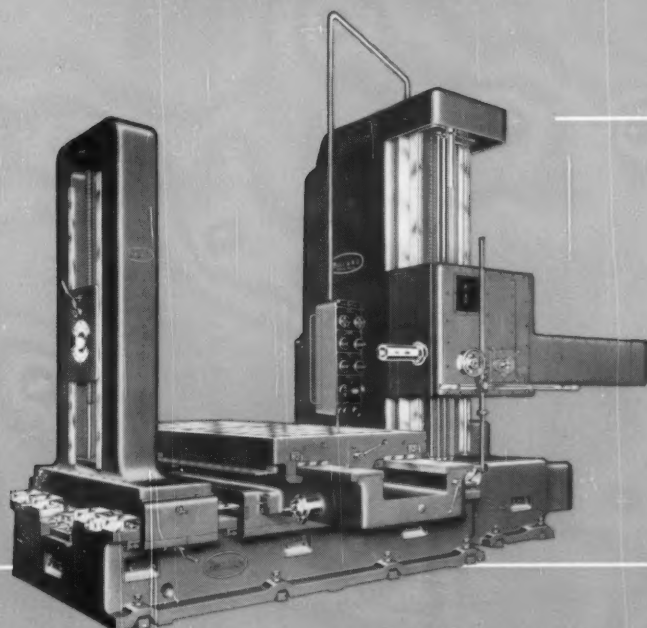
MULTY-AU-MATIC
Type "L"

10" with 6, 8, 12 or 16 spindles, 14" and 18" with 6 or 8 spindles. Automatic loader.



MAN-AU-TROL
Model 75

For fully automatic operation — may be applied to any or all heads of Cut Master V.T.L., Model 75 at time of ordering or in your plant at a later date.



**HORIZONTAL BORING, MILLING and
DRILLING MACHINE**
Model 75

3" 4" and 5" spindle — Available in many combinations of bed lengths, vertical capacity and table size. Automatic positioning.

ONE wide-range

"OXWELD" W-45 BLOWPIPE

Trade-Mark

handles EVERY welding

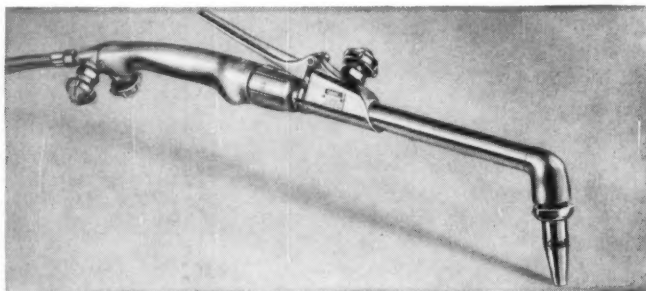
and heating job

**NO OTHER SINGLE BLOWPIPE OFFERS
THIS EXTENSIVE RANGE!**

Anyone whose daily work includes welding and heating will readily appreciate the amazing wide range and versatility of the new OXWELD W-45 Blowpipe. Its 18 head sizes (2 to 300 cu. ft. per hr. capacity) provide a perfect flame for every metal thickness. Light sheet to heavy plate, *one blowpipe does it all!*

From chrome-plated tip to offset hose connections, the W-45 shows the results of over a decade of development work by LINDE engineers. Its exclusive "jiffy-lock" heads, "form-fit" handle, and advanced styling are as modern as guided missiles and atomic power. "O" ring gas seals, flame-stabilizing mixers of improved type, and many other innovations put this blowpipe far ahead of the field in economy, ease of operation, and low-cost maintenance.

See for yourself how you can enjoy tomorrow's operating standards today with an OXWELD W-45 Blowpipe. Ask your LINDE representative for a demonstration, or write for free booklet, F-8684.



CW-45 Cutting Attachment adapts the W-45 Blowpipe for cutting steel up to 8 inches thick.



Linde Air Products Company

A Division of Union Carbide and Carbon Corporation

30 East 42nd Street  New York 17, N. Y.

Offices in Other Principal Cities

In Canada: LINDE AIR PRODUCTS COMPANY
Division of Union Carbide Canada Limited, Toronto
(formerly Dominion Oxygen Company)

The terms "Linde" and "Oxweld" are registered trade-marks of Union Carbide and Carbon Corporation.



Lo-swing

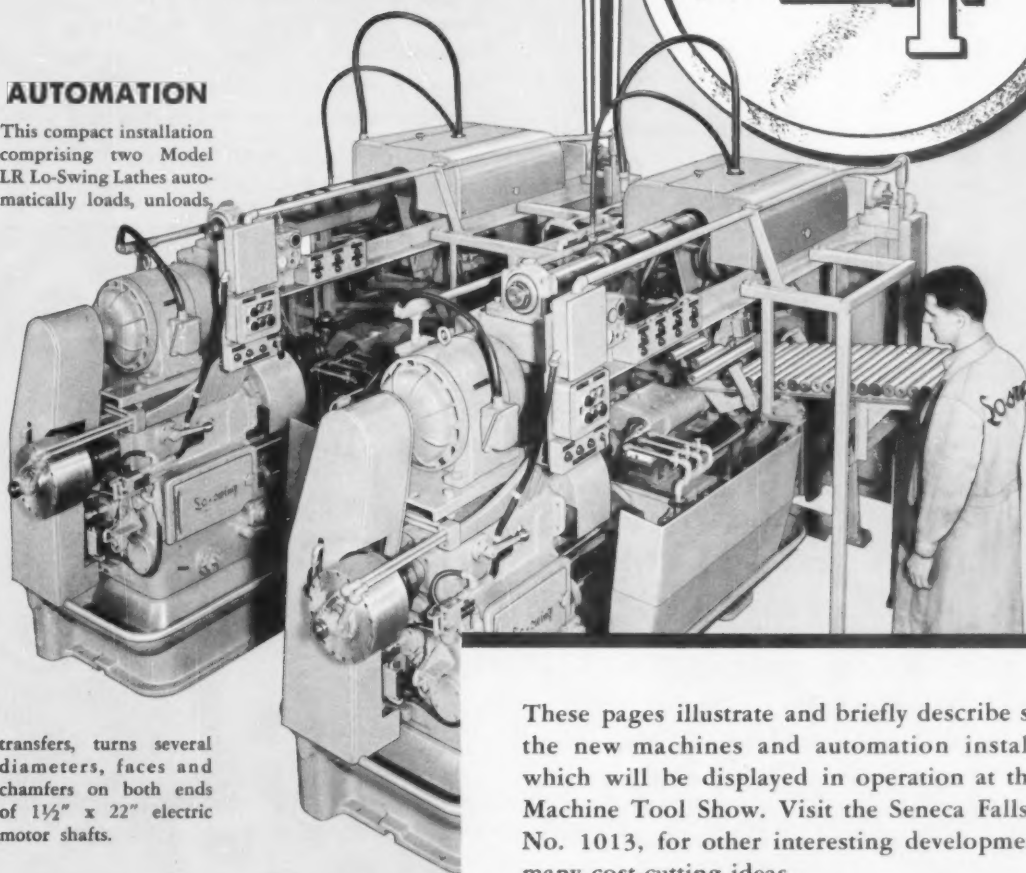
MACHINES AT THE SHOW



AUTOMATION

This compact installation comprising two Model LR Lo-Swing Lathes automatically loads, unloads,

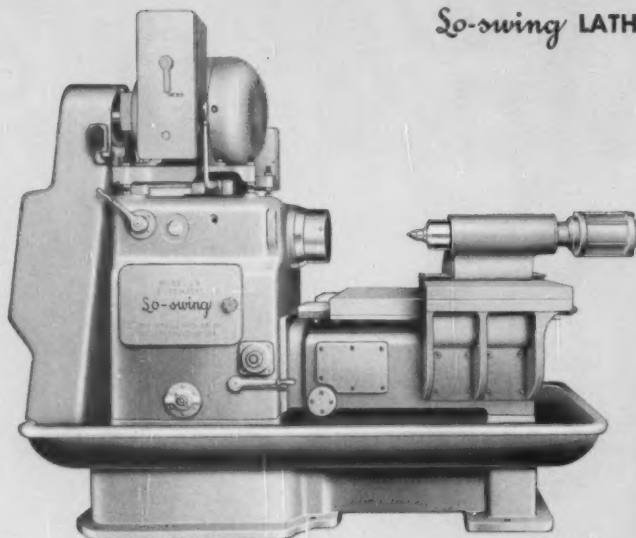
transfers, turns several diameters, faces and chamfers on both ends of 1½" x 22" electric motor shafts.



These pages illustrate and briefly describe some of the new machines and automation installations which will be displayed in operation at the 1955 Machine Tool Show. Visit the Seneca Falls booth, No. 1013, for other interesting developments and many cost-cutting ideas.

MODEL LN PLATEN TYPE AUTOMATIC

So-swing LATHE



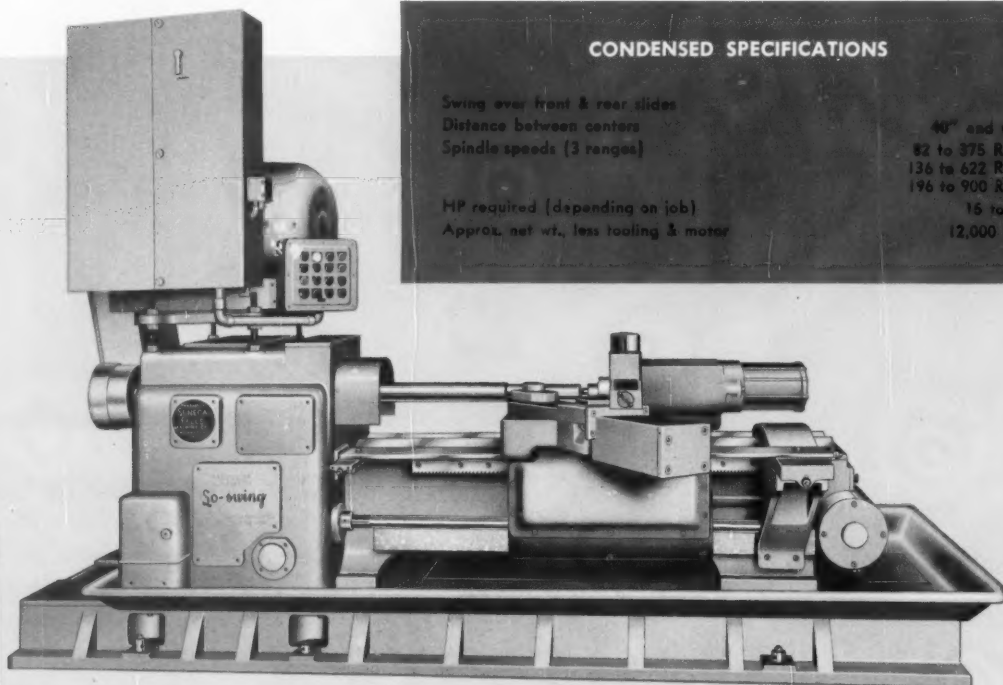
A fully-automatic, cam-operated lathe designed principally as a chucking machine adaptable to a wide variety of work requiring large swing capacity, high spindle speeds, multiple tooling and fast cycle operation. Its design, however, permits mounting an air-operated tailstock on a bridge which joins the front and rear sections of the bed, without obstructing movement of the platen. The tailstock provides additional support for long parts extending some distance from the chuck.

CONDENSED SPECIFICATIONS

| | |
|---------------------------------------|--|
| Swing, over bed ways | 24 1/2" |
| over platen | 19 1/2" |
| Maximum dia. of chuck, over platen | 18" |
| Spindle speeds (3 ranges) | 60 to 406 RPM 146 to 980 RPM 308 to 2080 RPM |
| Feed per revolution of spindle | .003" to .024" |
| HP required (depending on job) | 7 1/2 to 20 |
| Approx. net wt., less tooling & motor | 5,200 lbs. |

A modern, fully-automatic, high speed machine which can be easily set up and operated by semi-skilled labor. Recommended for machining shafts in small or medium lots, using a simple type of master template to reproduce size and profile. Operator pushes starting button and tracer-controlled tool rough turns, then finish turns, carriage

returns to starting position and spindle stops. Longitudinal feed is by rack and pinion, providing unlimited carriage travel. Fully-automatic Back Squaring Attachments, with synchronized feed cycle, are available for facing and undercutting operations.



CONDENSED SPECIFICATIONS

| | |
|---------------------------------------|---|
| Swing over front & rear slides | 3" |
| Distance between centers | 40" and 60" |
| Spindle speeds (3 ranges) | 82 to 375 RPM 136 to 622 RPM 196 to 900 RPM |
| HP required (depending on job) | 15 to 50 |
| Approx. net wt., less tooling & motor | 12,000 lbs. |

MODEL AP TRACER TYPE So-swing LATHE

MODEL WD WAYDRILL PRODUCTION UNIT



CONDENSED SPECIFICATIONS

| | |
|-------------------------------------|--------------------------|
| Standard speed range, | 130 to 1150 RPM |
| with 1150 RPM motor | |
| with 1750 RPM motor | 200 to 1750 RPM |
| Standard drilling feed | .004" to .017" |
| Special drilling feed | .001" to .050" |
| Rapid traverse, inches per min. | 300 |
| Maximum thrust | 11,000 lbs. |
| Maximum feed stroke, width & height | 16" |
| Drilling area of head | 20" x 19" |
| Maximum frame size of motor | NEMA 326 |
| Overall dimensions | 20" x 74" x 33 1/4" high |

A completely self-contained, simple yet rigid unit operating from a single motor. May be grouped together for any drilling, boring, reaming, counterboring and tapping operations and will operate at any angle. Feed movements are through a lead screw, so arranged as to permit intermittent feeding and rapid traverse during the stroke of the drilling head, thereby reducing machining time on work involving intermittent cutting. The drilling head is cushioned at the end of the stroke to prevent "break through" of the drills. Feed and rapid traverse movements are automatically controlled by adjustable stops. Lubrication is completely automatic. Available attachments permit two rates of drilling feed, desirable when counterboring takes place at the end of the feed cycle. Another attachment permits counterbores to "dwell" for a certain number of revolutions at the end of the cut.

The Seneca Falls Model DM is made from standardized units assembled on a base casting or welded platform. The machine may be composed of one or several drilling heads which in turn may be equipped with single or cluster drilling spindles. The base may be fitted with an automatic indexing fixture to rotate work pieces through a series of stations under the drilling, reaming or tapping spindles. Work pieces are loaded in suitable holding fixtures, and when automatically loaded, two stations on the indexing table are reserved for loading and unloading. A fully-automatic cycle can be utilized, including automatic "pick-up" from a conveyor line, automatic loading, machining and indexing, and finally, automatic ejection of the finished part on another conveyor line.

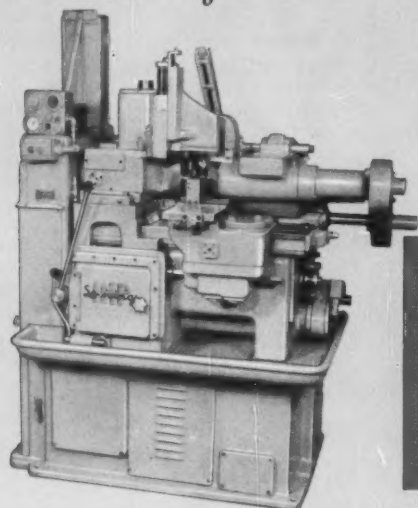
CONDENSED SPECIFICATIONS

| | |
|----------------------------|--------------------------------|
| Height of machine | 110" |
| Feed of head, maximum | 16" |
| Drilling area of head | 20" x 19" |
| Diameter of indexing table | 26" |
| Spindle speeds | 130 to 1150 or 200 to 1750 RPM |
| Head drive motors | Depends on work piece |
| Number of spindles | |

MODEL DM AUTOMATIC DRILLING AND REAMING MACHINE



AUTOMATED Lo-swing IMP



A Rotary-type Automatic Loader assures a constant flow of pump gears through this lathe, which turns, faces, and chamfers, on a complete automatic cycle. Gears are placed in the loading chute and feed by gravity to openings in the Rotary Loader, which indexes them to proper position. Revolving spindles, which are withdrawn during the indexing phase, then pick them up for machining. The fast revolving gears are completely stationary when they reach the discharge chute.

SPECIFICATIONS OF LO-SWING IMP

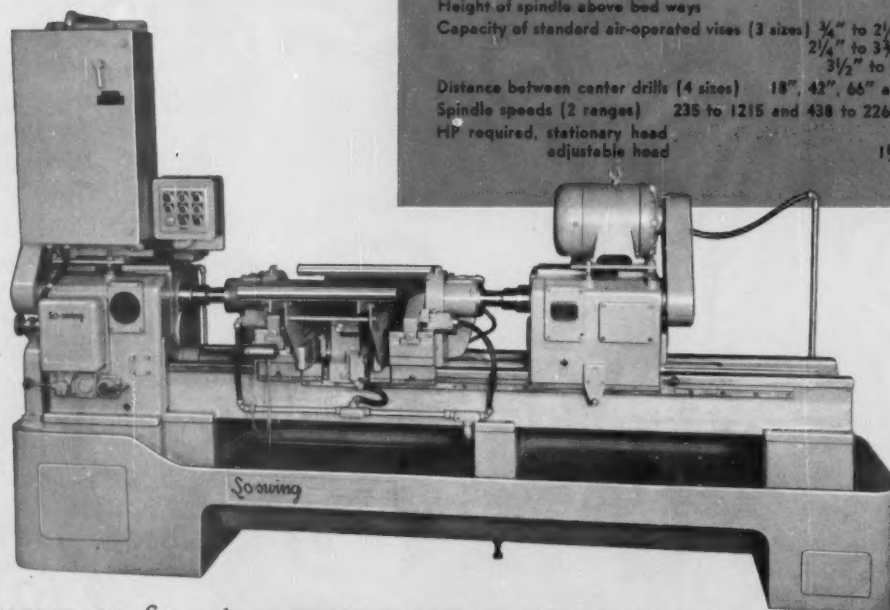
| | |
|---------------------------------------|--|
| Swing over front & rear slides | 4 1/2" |
| Distance between centers (2 sizes) | 8" or 12" |
| Spindle speeds (3 ranges) | 400 to 1750 RPM 800 to 3500 RPM 1020 to 4500 RPM |
| HP required (depending on job) | 3 to 5 |
| Approx. net wt., less tooling & motor | 4,000 lbs. |

A "Walking Beam" type of Loader and special vises equip this Centering Machine for completely automatic operation. Shafts arrive by conveyor and roll to a fixed stop on the loading rails. The loader has two work carrier arms which operate with a rotating movement and handle both rough and finished pieces simultaneously. As the un-

loading arms remove and eject a finished piece, the loader arms, in their trajectory, pick up a rough piece and lower it into the vise jaws. It is then automatically clamped in position, the feed starting clutch engages and the shaft is centered. At the end of the feed cycle, the center drills retract and the vises open.

SPECIFICATIONS OF MODEL CS LO-SWING

| | |
|---|---|
| Height of spindle above bed ways | 9 1/4" |
| Capacity of standard air-operated vises (3 sizes) | 3/4" to 2 1/2" dia. 2 1/4" to 3 1/4" dia. 3 1/2" to 5" dia. |
| Distance between center drills (4 sizes) | 18", 42", 66" and 90" |
| Spindle speeds (2 ranges) | 235 to 1215 and 438 to 2264 RPM |
| HP required, stationary head | 3 |
| adjustable head | 1 1/2 to 3 |

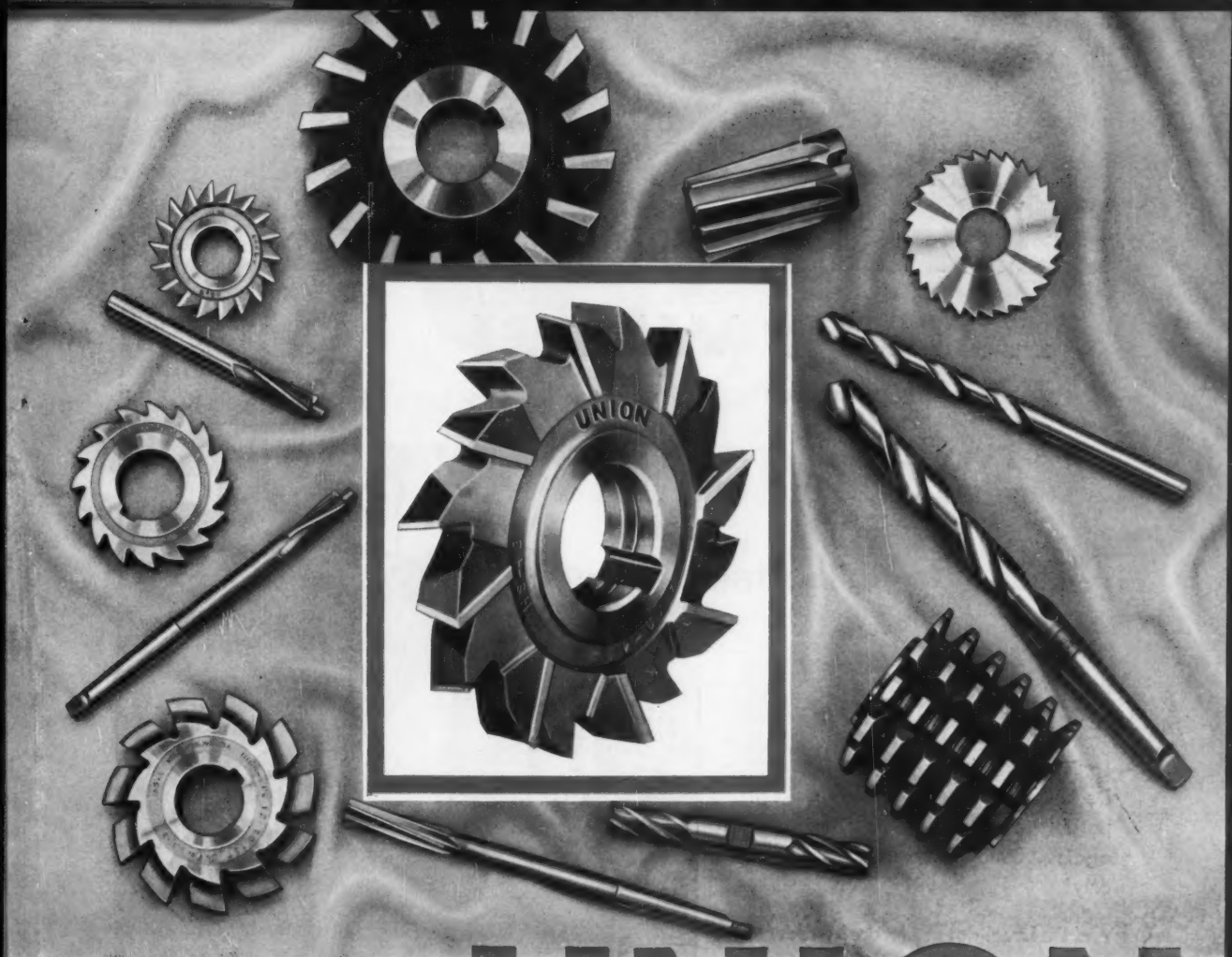


AUTOMATED MODEL CS Lo-swing DRILLING AND CENTERING MACHINE

SENECA FALLS MACHINE CO.

SENECA FALLS, N. Y.

LITHO. IN U.S.A.



**IN THE METALWORKING
INDUSTRY, IT'S**

UNION



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UNION TWIST DRILL COMPANY • ATHOL, MASSACHUSETTS

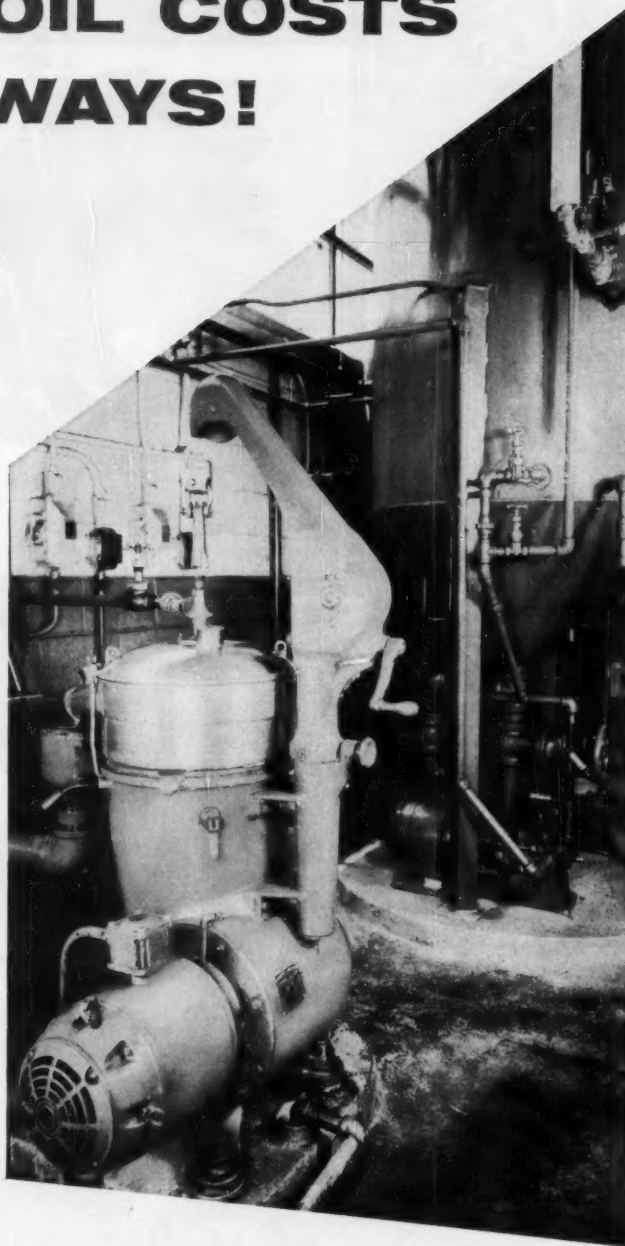
OWNERS AND OPERATORS OF: S. W. CARD MANUFACTURING CO. DIVISION, Mansfield, Mass.
BUTTERFIELD DIVISION, Derby Line, Vermont and Rock Island, Quebec

HOW TO CUT CUTTING OIL COSTS ...TWO WAYS!

De Laval Cutting Oil Purifiers make it possible to use cutting oil over and over again...holding oil costs to "make-up" only!

And De Laval does still more!...reduces hidden costs of using incompletely purified oil...prevents excess tool wear...unnecessary down time...over-high reject percentage...undue wear on machine parts lubricated by the cutting oil!

De Laval Cutting Oil Purifiers make money by saving money. Get all the facts. Write today for De Laval Bulletin FC.



DE LAVAL

Purifiers and Clarifiers for Factory Oils

THE DE LAVAL SEPARATOR COMPANY Poughkeepsie, New York • 427 Randolph St., Chicago 6 • DE LAVAL PACIFIC CO. 201 E. Millbrae Ave., Millbrae, Calif.

when you visit



don't miss the

ALL-STAR PERFORMANCE

SEE THE

Potter & Johnston Automatic Turret Lathes
IN ACTION!



THE 3-U AUTOMATIC

... the right machine to produce small, precision parts faster, better.

THE 4-U AUTOMATIC... extra power to take full advantage of faster-cutting carbide tooling.

...and the 6DRE-40... real productive power (40 hp) for lower unit cost on really tough jobs.

SEE FOR YOURSELF...



how these designed-for-tomorrow machines can help you build greater productive efficiency today!

POTTER & JOHNSTON Co.
PAWTUCKET, RHODE ISLAND

SUBSIDIARY OF

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PRECISION PRODUCTION TOOLING



FOR MORE THAN FIFTY YEARS

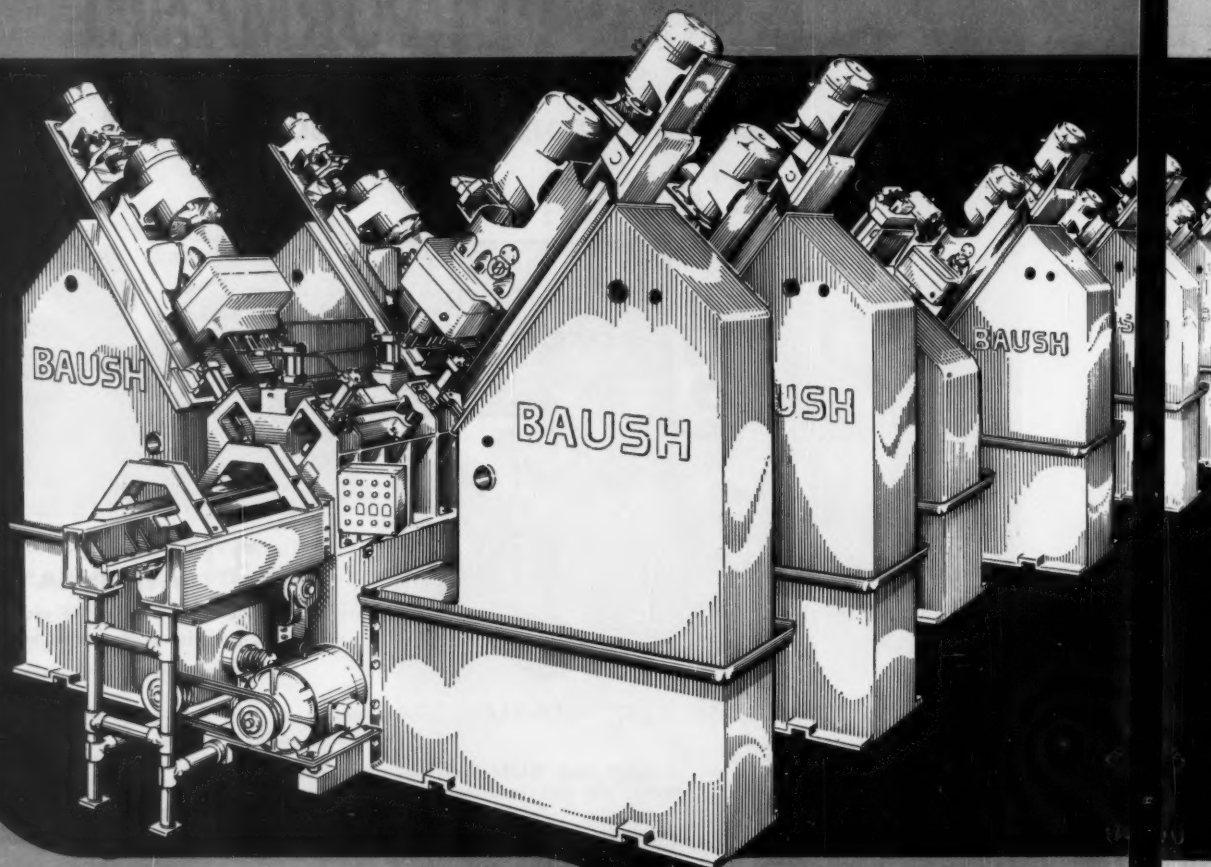
AUTOMATION!

MAXIMUM PRODUCTION AT MINIMUM COST
... through the practical, automatic operation of machine tools and gaging.
Whether producing automotive or aeronautical engines complete in large plants, or making component parts in a smaller shop, dramatic production and savings in costs can be made. "Downtime" is reduced—production cycles made

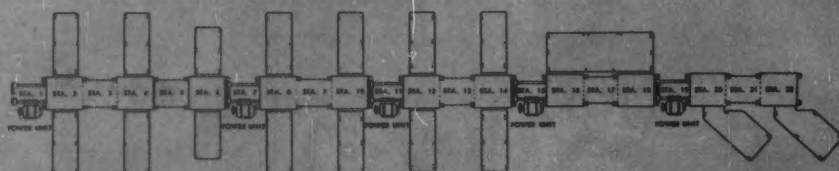
shorter, and parts move steadily through all operations with less waste and loss of operator time.

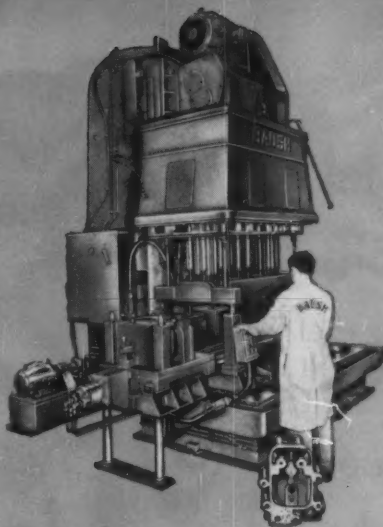
Baush builds from your own designs, or you can use our years of experience and "know-how" to design and build automatic, multi-spindle, multi-operation machine tools or transfers.

YOU CAN'T DO BETTER THAN TO RELY ON BAUSH! SEND US YOUR MACHINE TOOL PROBLEMS — NOW!



Baush 22-station transfer completes 12,600 operations per hour in drilling, core-drilling, chamfering and reaming 120 cylinder blocks an hour.

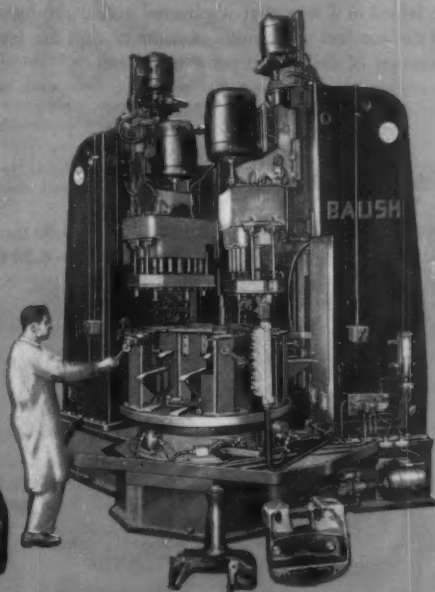
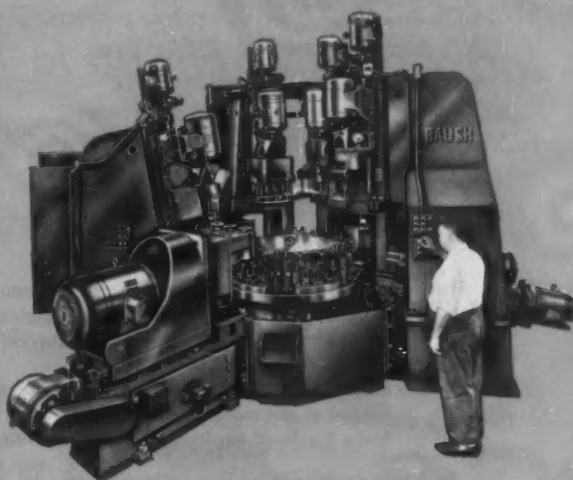




Baush Heavy Duty Drills — for large holes in tough metals — in this case, heavy diesel motor cylinder heads with 16 holes ranging from 21/32" to 1 1/2" in diameter.



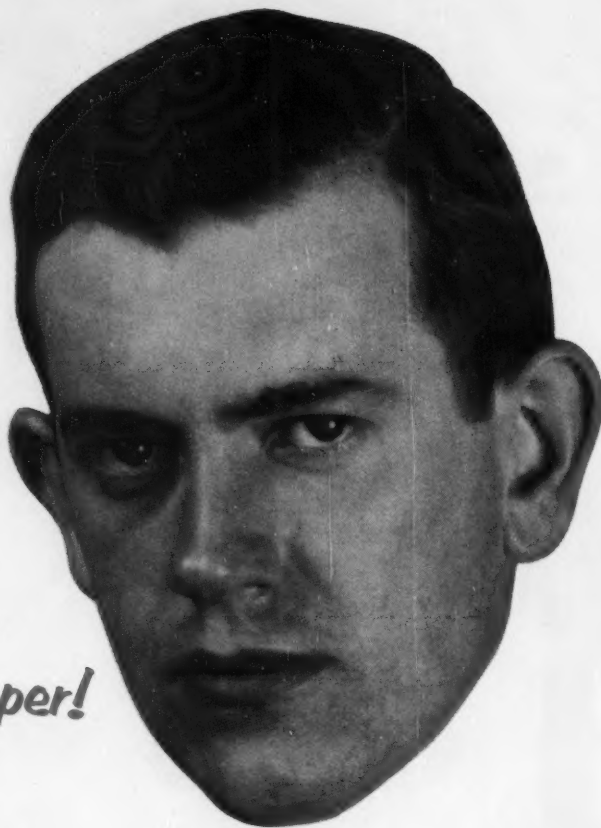
Baush 8-way unit machine with rotary table — designed to mill, drill, core-drill, chamfer, ream and tap 21 holes in mounting and exhaust pads of 100 exhaust manifolds per hour.



Baush dual-column unit machine performs 858 drilling, chamfering, reaming and spotfacing operations on 33 Tractor Pedestals per hour at 80% efficiency.

Baush designed and built these machine tools for specific jobs . . . they can do the same for your special requirements.





*Plant tests prove
Sinclair Wilkut 'A'
increases tool life up to
150% on Beryllium Copper!*

One of the foremost manufacturers of industrial controls recently had an expensive problem with excessive drill wear on their automatic screw machines. Moreover, tool changes in mid-shift resulted in a substantial reduction of finished parts per 8-hour shift!

J. H. Thurow, Sinclair Industrial Representative reports: "They wanted to lengthen tool life to use not more than one drill per shift. But this was difficult as the beryllium copper being drilled had a Rockwell hardness of R_b 88-92, with a machinability rating of 60."

Finished parts production increased as much as 3.8 thousand per drill!

"We recommended Sinclair WILKUT® 'A' as ideally suited for this job," continues Mr. Thurow. "Four competing oils were tested in a way that duplicated actual production conditions on their machines — 5000 RPM and 100 surface feet per minute. Results of drill life tests were quite impressive . . . the following shows the number of drills used per 8-hour shift:

Competitive Oil A — 1.60
Competitive Oil B — 1.40

Competitive Oil C — 1.07
Sinclair WILKUT 'A' — 0.64

"In terms of actual finished parts per drill, the tests showed:

Competitive Oil A — 2.40 thousand
Competitive Oil B — 2.70 thousand

Competitive Oil C — 3.60 thousand
Sinclair WILKUT 'A' — 6.20 thousand

It will pay you to get the facts on the performance benefits of non-staining type, sulfurized WILKUT Cutting Oils. Contact your local Sinclair Representative, or write to Sinclair Refining Company, Technical Service Division, 600 Fifth Avenue, New York 20, N. Y.

SINCLAIR

CUTTING OILS and COOLANTS

carbides?

IMPELLER HUB — 4" diam., 1 1/4" long, from SAE 1146 annealed steel forging. **JOB ANALYSIS** determined multiple-spindle chuckers with **ALL CARBIDE** tooling.

11 operations on first side, on 6" Acme-Gridley 8-spindle chucker with double indexing and duplicate tooling. 2 pieces per cycle in 22 1/2 seconds machine time — 320 pieces per hour.

17 operations on other side on single indexing 6" Acme-Gridley 8-spindle chucker. 26 seconds machine time — 138 pieces per hour.



high speed?

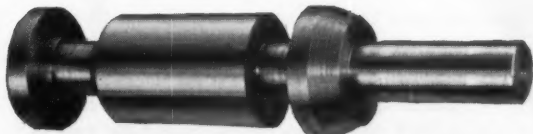
SEAL RING — 1/2" thick, from 2 1/2" diam. steel 6150 annealed. **JOB ANALYSIS** classed this as single-spindle job with HSS tooling.

5 shoulders rough and finish-formed to .002 tolerance, seat diam. held to .0005 tolerance, on 3 1/2" single-spindle Acme-Gridley bar-type turret lathe. 7 minutes machine time — 8 (plus) pieces per hour.

Spindle speed automatically changed 4 times during cycle to provide suitable speeds and feeds for required finish.



or BOTH?



SHAFT — 7 3/4" long, from 1 1/8" diam. steel 6250 annealed. **JOB ANALYSIS** indicated single-spindle bar-type turret lathe, with part **CARBIDE** and part **HSS** tooling.

10 operations including deep forming, turning and form-turning on 3 1/2" single-spindle Acme-Gridley bar-type turret lathe: 5 minutes 46 seconds machine time — 9 (plus) pieces per hour.

5 automatic changes of spindle speed during the cycle provided speeds and feeds best suited for using both **HSS** and **Carbide** tools.

let the job analysis dictate the right tooling method

(And the Right Machine)

All Acme-Gridleys are built with a rigidity factor to withstand the pressure of *any* cutting tool yet devised—at speeds as fast as modern cutting tools can “take it.” With such a margin of power, speed and stamina built into each of National Acme’s **COMPLETE LINE** of multiple- and single-spindle bar and chuck-type automatics, you can safely let the job analysis dictate:

1. The best tooling method.
2. The machine best suited to produce the job most economically.

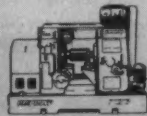
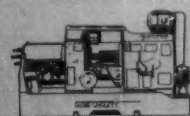
And you can be equally sure that tooling recommendations from National Acme will be based upon sound, experienced judgement.

If you would like a complete job analysis, we’d be glad to give you the benefit of our experience.

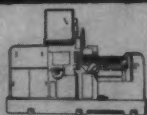
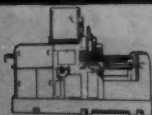


BOOTHS 324 AND 705

You can see National Acme’s **COMPLETE LINE IN ACTION** at the Machine Tool Show. Study these modern machines. Ask questions. Then you’ll learn why Acme-Gridleys are your best investment — for greater productivity today, and to maintain “new-machine-productivity” longer.



OUR JOB: to provide the *Right Machine* for **YOUR JOB**



Acme-Gridley 4, 6 and 8 Spindle Automatic Bar and Chucking Machines • Fully Automatic Turret Lathes (Bar and Chuck Type) • Hydraulic Thread Rolling Machines • Automatic Threading Tools • Switches • Solenoids • Contract Manufacturing.

THE NATIONAL ACME COMPANY

179 EAST 131st STREET • CLEVELAND 8, OHIO

Set Your Sights on Greater Productivity
ZERO IN ON BOOTH
920

Sept. 6-17

at the Machine Tool Show

See Many of these
Monarch Lathes in Action

TOOLMAKER'S LATHES
in a complete range of sizes
ENGINE LATHES
in a complete range of sizes

THE MONA-MATICS
for high production metal turning
THE HYDRA-SLIDE
for high production chucking
and fixture work

THE SPEEDI-MATIC
a fast, precision hand screw machine

MONARCH-KELLER TURNING MACHINE

THE MONARCH MOTOR-TRACE

THE MONARCH AIR-GAGE TRACER

THE MONARCH ROLL TURNING LATHES

THE MONARCH 60" RIGHT ANGLE LATHE

THE SHAPEMASTER ENGRAVER

PLUS - the New Monarchs—
First Showing

Make your primary target the finest metal turning equipment ever produced—at the Monarch exhibit just inside the main entrance, first floor. See for yourself the great new strides Monarch has made to give you radically new standards of productivity.

See the new Monarch Series 90 Dyna-Shift Lathes in action—the Series 62 *Preselector* Dyna-Shift Lathes—the Hydra-Slide (for high production chucking and fixture work)—the fabulous Series EE Model 1000, with features making it the most versatile lathe of its capacity on the market. PLUS an array of completely new cost-cutting lathes to be presented for the first time at the show.

Plan to give us lots of time at Booth 920—for better business' sake! (It's a handy place to meet friends, too.) See you in Chicago! ... *The Monarch Machine Tool Company, Sidney, Ohio.*

Monarch
TURNING MACHINES



It's easy to SEE economy

when ② jobs are done by ①

BIRDSBORO Hydraulic Press!

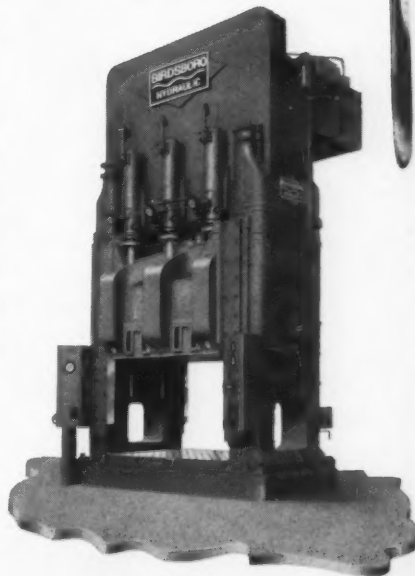


Cold Pressing

Hot Forging

Unusual Flexibility in Press Operation...

proves the high efficiency and economy of BIRDSBORO Hydraulic Press Design. When you combine this feature with the advanced engineering that gives you high production and trouble-free operation, you see why BIRDSBORO has taken its position as a leader in the field. Call on the experience and design know-how of BIRDSBORO to give you low-cost, more efficient production.



HP-22-55

BIRDSBORO

Designers and Builders of: Steel Mill Machinery; Hydraulic Presses; Crushing Machinery; Special Machinery; Steel Castings; Steel, Alloy Iron, and Alloy Steel Rolls; and Cast Weldments

BIRDSBORO STEEL FOUNDRY & MACHINE CO., BIRDSBORO, PENNA. Offices in Birdsboro, Pa., and Pittsburgh, Pa.

For more information on products advertised, use Inquiry Card, page 325

MACHINERY, September, 1955—44A

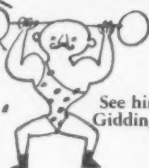
THE
MACHINE TOOL
SHOW
CHICAGO, ILL.
SEPT. 3-10, 1955
INTERNATIONAL MACHINISTS

BOOTH
710

A MILLION
DOLLAR ACT IN THE

GREATEST

SEE IT AT GIDDINGS &

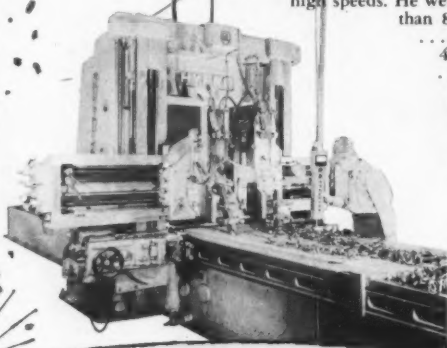


TAURUS

The Strong Boy

See him flex his sinews of iron and steel. This huge Giddings & Lewis Hypro Double Housing Planer is new from the floor up. You'll see this giant plane cast iron and steel at a rate of 400-ft. per minute. Watch him perform at high speeds. He weighs more than 85,000-lbs.

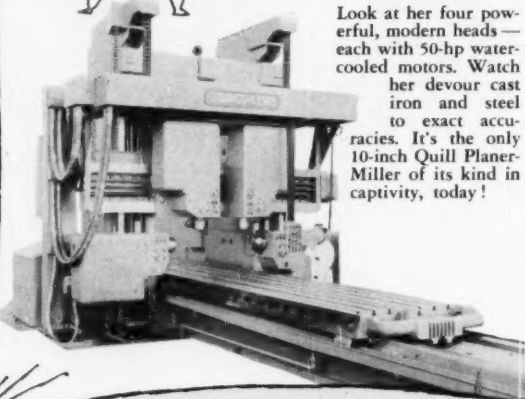
... has a bed
48-ft. long
... a 22-ft.
table ...
49½ in.
between
 housings.



BIG MILLIE

The 4-Headed
Fat Lady

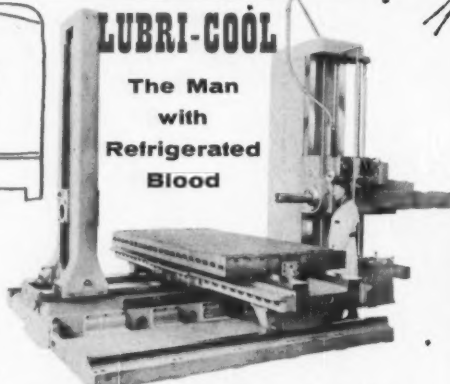
Look at her four powerful, modern heads — each with 50-hp water-cooled motors. Watch her devour cast iron and steel to exact accuracies. It's the only 10-inch Quill Planer-Miller of its kind in captivity, today!



LUBRI-COOL

The Man
with
Refrigerated
Blood

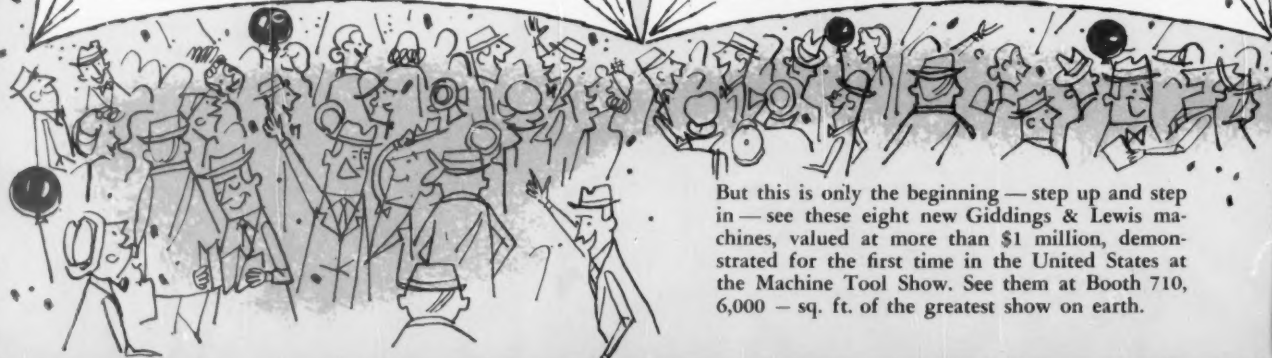
And, here you can see another wonder of the machine tool age ... the new Model 350-T Table-Type Horizontal Boring, Drilling and Milling Machine. It has anti-heat control for its veins — a new refrigerant system for cooling the lubricant of the milling feed and headstock mechanism.



REVOLVO

The
Magician

You'll see this "baby" go through its magic operations. It has a 30" x 36" built-in revolving table for fast and accurate indexing of difficult work setups. It has a 3-inch spindle ... it's equipped with an improved measuring device and continuous feed facing and boring head. See the new 300-RT in action — and later in your own toolroom.



But this is only the beginning — step up and step in — see these eight new Giddings & Lewis machines, valued at more than \$1 million, demonstrated for the first time in the United States at the Machine Tool Show. See them at Booth 710, 6,000 — sq. ft. of the greatest show on earth.

SHOW ON EARTH

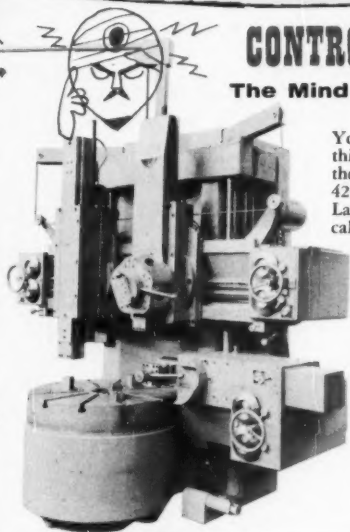
LEWIS MACHINE TOOL CO. BOOTH 710



BOOTH
710

CONTROLLUS

The Mind Reader

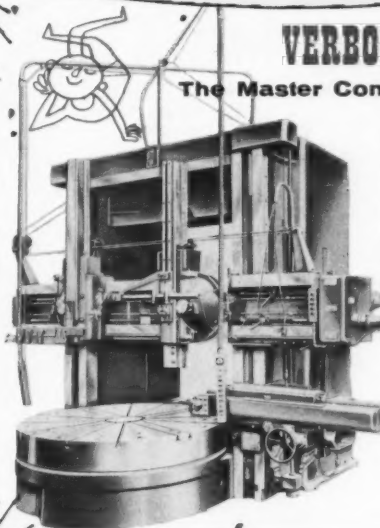


You won't see anything like it in all the world. Here's a 42" Vertical Turret Lathe that practically thinks for you.

Its vital nerve centers control four types of heads, simple "joy stick" directionally controls feed and traverse movements. Machine has coaxial micrometer dials and also various table arrangements.

VERBORO

The Master Contour-tionist



For the first time at any show — watch this 8-ft. Vertical Turning and Boring Mill perform.

It astounds the imagination. You'll see it operate at extra-high-speed ranges and marvel at the electronically controlled duplicator which provides two-dimensional control.

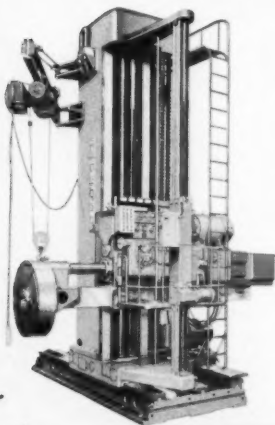
BIG JUMBO



World's Smartest Elephant

Watch him lift machine tool accessories with ease for any machining operation . . .

lift the operator to any position . . . provide added support under headstock for mounting heavy attachments. It's Giddings & Lewis new Model 570-FUAR, 75-hp, Floor-Type, Horizontal, Drilling, Boring and Milling machine.



ATHENE



World's Most Beautiful Amazon

Here's the new Model 460-FUAR, the first of G&L's 40 Series design. She has outstanding machining ability. What's more she has the famous Giddings & Lewis underarm support for added machine capacity. An exclusive power hoist enables the operator to mount quickly, heavy tools and attachments.



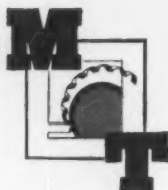
For more information on the outstanding design features of these new machines, see a Giddings & Lewis representative at the Booth. He'll be glad to help you solve your production problems and tell you what Giddings & Lewis versatile and economical machines can do for you.



**GIDDINGS & LEWIS
MACHINE TOOL CO.**

FOND DU LAC, WISCONSIN

Printed in U.S.A.



◀ This symbol identifies the National Machine Tool Builders' Association—a group of 196 manufacturers of machine tools. 148 of these companies, or 3 out of 4, are using Garlock KLOZURE Oil Seals.

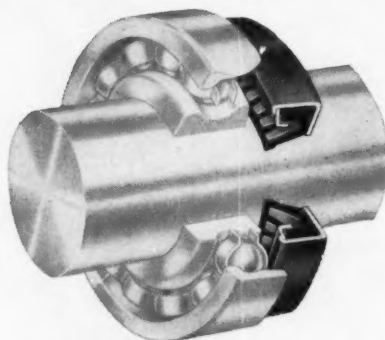
3 out of 4

Machine Tool Builders use KLOZURE* OIL SEALS

Here are 3 reasons why—

1. The KLOZURE Oil Seal is a precision-made product, so necessary for all components of the tools which are designed for fine precision machining.
2. KLOZURES are *uniform*—both in sealing contact and in spring load.
3. KLOZURE Oil Seals are extremely *efficient*—they provide effective sealing with a minimum of power loss and heat generation.

For positive bearing protection specify KLOZURE Oil Seals for your machinery. KLOZURES are made in many models and a complete range of sizes. Get all the facts—call your Garlock representative or write for KLOZURE Catalog No. 10.



Model 53 finger spring KLOZURE, for normal and high speed service, applied to a shaft to protect the ball bearing.



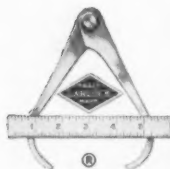
Model 51 — A general purpose finger spring seal for medium speeds.



Model 63 — A general purpose finger spring seal for normal and high speed service.



Model 65 — A general purpose garter spring seal for normal and high speed service.



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**PACKINGS, GASKETS, OIL SEALS,
MECHANICAL SEALS,
RUBBER EXPANSION JOINTS**



Rheem solves a "toughie"
and increases production

*three hundred
per cent*

Machining the various contours of these guided missile components with the accuracy and finish required was a problem that Rheem Mfg. Co., Aircraft Division at Downey, California, had to lick.

The answer
"AMERICAN"

HYDRAULIC DUPLICATING LATHES

These pieces are now machined inside and out from the rough forging, with the accuracy and degree of finish demanded, in 68 minutes floor to floor—removing 23 pounds of metal from each piece.

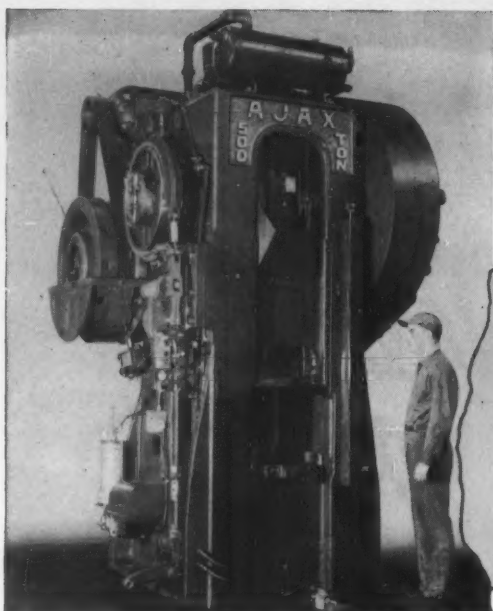
The simplicity and dependability of the duplicating equipment plus the power and sturdiness of the "AMERICAN" Lathe proved just the right combination for this difficult job.

We specialize in "tough ones"—better ask us about your "problem" jobs.

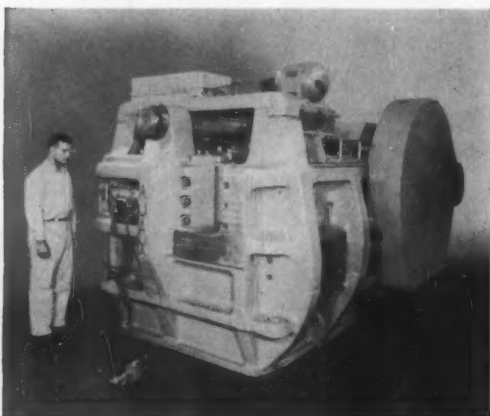
THE AMERICAN TOOL WORKS CO.

Cincinnati 2, Ohio, U. S. A.

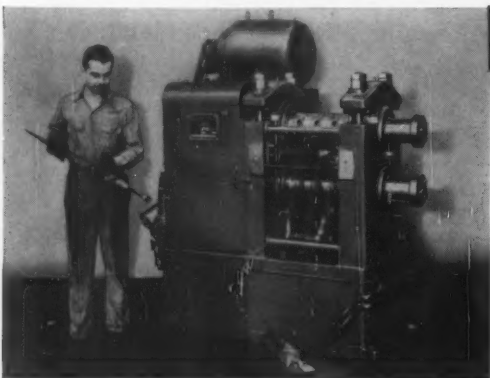
LATHES AND RADIAL DRILLS



AJAX 500 TON FORGING PRESS



AJAX 3" FORGING MACHINE —
with automatic transfer mechanism



AJAX NO. O FORGING ROLL

46—MACHINERY, September, 1955



see these
AJAX MACHINES
in operation at the
MACHINE TOOL SHOW

CHICAGO, ILL.

SEPT. 6-17, 1955

INTERNATIONAL AMPHITHEATRE

BOOTH NO. 1309

THE

Ajax

MANUFACTURING
COMPANY

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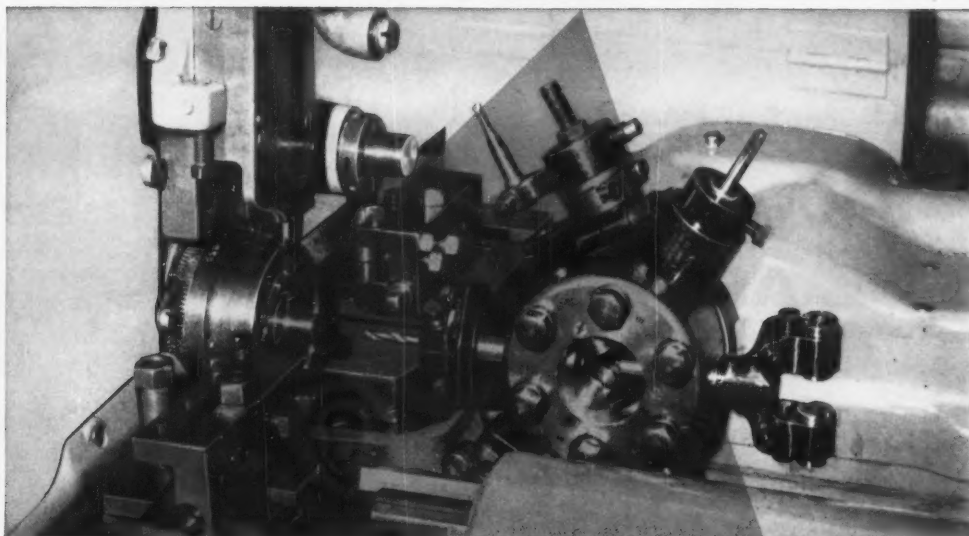
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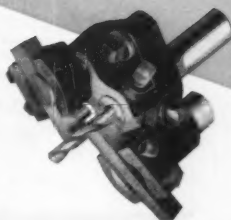
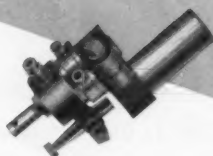
1209 Burlingame Ave.
BURLINGAME, CALIF.

6440 Fleet St.
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A MACHINE IS ONLY AS GOOD AS THE TOOLS USED ON IT!

FOR PRECISION AND
ECONOMY — R and L
TOOLS ARE UNBEATABLE



That is why leading manufacturers* supply R and L TOOLS as original equipment with their machines. We know of no finer testimonial, with the possible exception of the fact that last year 86.7 of all R and L TOOL orders were *repeat orders* . . . Satisfied customers who wanted more of the precision, time-saving and money-making qualities built into every R and L TOOL.

*List of manufacturers supplied on request.

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1825 BRISTOL ST.
PHILADELPHIA 40, PA.



- ☐ Please send me your new catalog
☐ Please arrange for no-obligation demonstration of R and L TOOLS

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1825 BRISTOL STREET • PHILADELPHIA 40, PA.

TURNING TOOL • CARBIDE OR ROLLER BACKRESTS • RELEASING OR NON-RELEASING TAP AND DIE HOLDERS, (ALSO FURNISHED FOR ACORN DIES)
• UNIVERSAL TOOL POST • CUT-OFF BLADE HOLDER • RECESSING TOOL • REVOLVING STOCK STOP • FLOATING DRILL HOLDER • KNURLING TOOL

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M-9

P-K "proving ground" for

ASSEMBLY STRENGTH



The "proving ground" for the holding power of P-K Socket Screws is industry-wide. Millions of assemblies made by thousands of satisfied customers are your assurance that screws made to P-K quality standards meet every test.

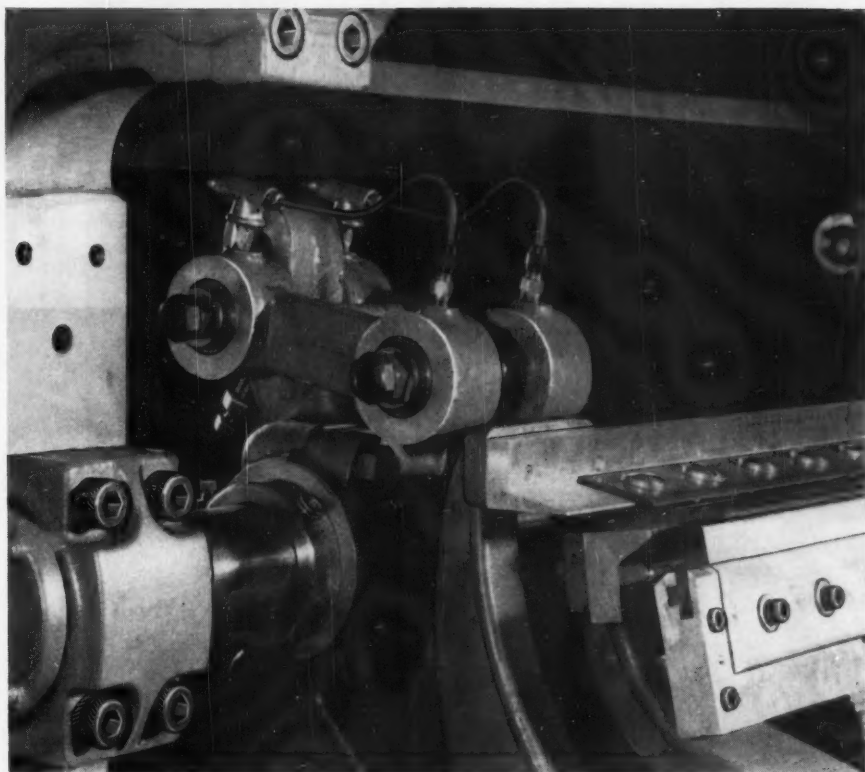
In many of these assemblies, P-K Socket Screws are subjected to extreme conditions of shock and vibration . . . such as ordnance and other products made to exacting demands of the Armed Forces.

Get samples, information from your P-K Distributor, or write:
Parker Kalon Division, General American Transportation Corporation,
202 Varick St., New York 14.



Used by thousands of cost-wise buyers
in millions of assemblies . . . to

make planned savings pay off



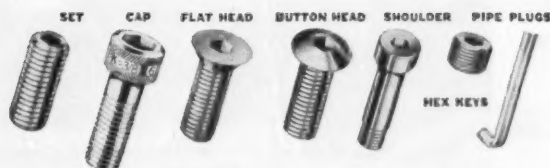
STAY TIGHT UNDER TOUGHEST CONDITIONS

In the warp knitting machine, above, P-K Socket Screws stay tight under constant vibration. Some of many different P-K Socket Screws used are shown — P-K Cap Screws in shaft bearing pads and needle bar clamps, and P-K Set Screw in collar on needle bar rocker shaft.

For ALL essentials of cost-wise assembly — get P-K Socket Screws

- **FOR ADVANCED DESIGN** that speeds assemblies—makes them simpler, stronger — and saves errors.
- **FOR TOP QUALITY** and tolerance gaged to your most exacting specifications — and guaranteed.
- **FOR ASSEMBLY STRENGTH** okayed in a million punishing tests by thousands of satisfied users.
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Remember

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OK

**YOU CAN GAGE
40 or MORE
DIMENSIONS**
As Quickly
AS YOU CAN ONE

Spectacular developments in AIR gaging are saving industry millions of dollars and thousands of man-hours. Here's how and why:

1. One operator with one gage can check up to 40 or more dimensions of each work part simultaneously and instantly. The number of parts per hour depends solely on how fast the inspector can handle them.

2. Precision is built into the gage—readings are unaffected by human skill, human judgment and human memory. It's not necessary to memorize and compare readings for individual dimensions—one quick panoramic glance at the float pattern ("Airechart") tells the whole story—the "Float Graph" shows the true condition of every critical dimension.

3. The position of each float shows just where the dimension is within tolerance limits or just how much above or below limit if it is out of tolerance. This is essential for Quality Control.

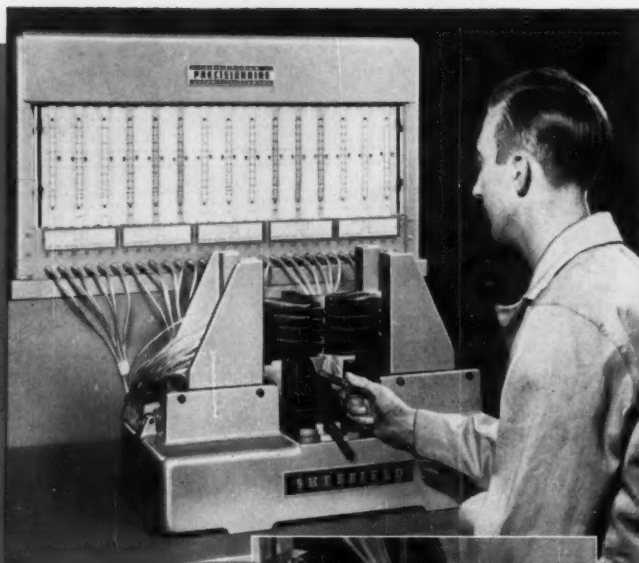
PHONE, WIRE or WRITE for the full story on how YOU can "produce more and better products at lower cost through practical precision"—in this case, multiple dimension inspection by Precisionaire gaging.

Gage Division—The Sheffield Corporation
Dayton 1, Ohio, U. S. A.

See us at the
Machine Tool Show, Booth 1305

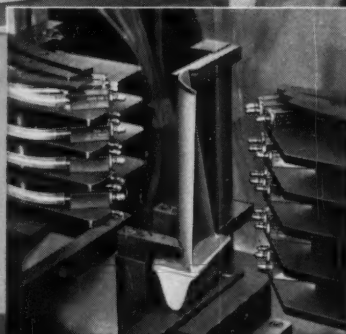


SHEFFIELD



Checking 30 points
on a jet engine blade

Gaging heads ready
to approach the jet
engine blade



All main bearings of a tractor crankshaft are checked
simultaneously

6757

UNIVERSAL DRILL BUSHINGS

INSURE PERFECT ALIGNMENT AND LONG LIFE OF PRODUCTION TOOLS

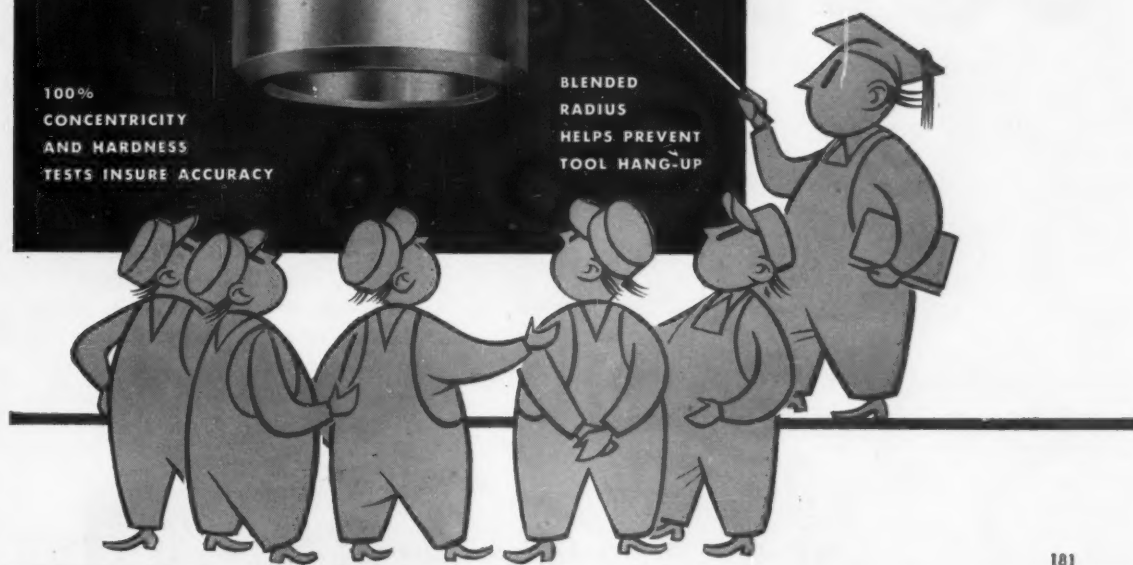
SUPERFINISH
BORES REDUCE
TOOL WEAR

100%
CONCENTRICITY
AND HARDNESS
TESTS INSURE ACCURACY

KNURLED
HEADS PROVIDE
GOOD GRIP

BLENDED
RADIUS
HELPS PREVENT
TOOL HANG-UP

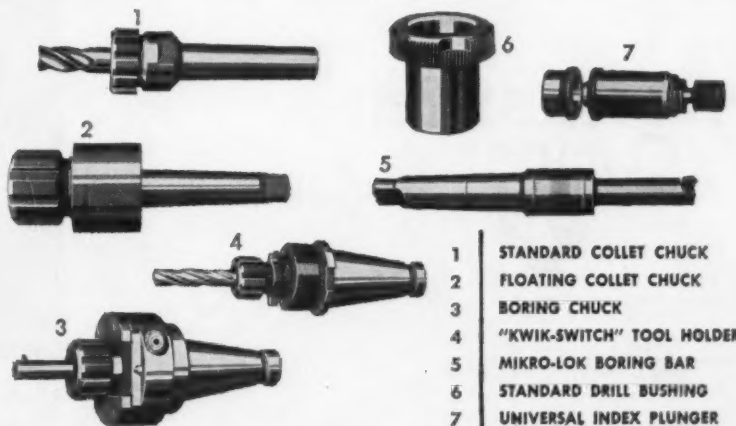
Universal Drill Bushings are available in a complete range of standard sizes and lengths. Special sizes made to order. Write to Universal Engineering Sales Co., 1060 Broad St., Newark 2, N. J.; 5035 Sixth Ave., Kenosha, Wis.; or the home office.



181

UNIVERSAL ENGINEERING COMPANY

FRANKENMUTH 2
MICHIGAN



- 1 STANDARD COLLET CHUCK
- 2 FLOATING COLLET CHUCK
- 3 BORING CHUCK
- 4 "KWIK-SWITCH" TOOL HOLDER
- 5 MIKRO-LOK BORING BAR
- 6 STANDARD DRILL BUSHING
- 7 UNIVERSAL INDEX PLUNGER

felt..

molded into special shapes

American felts are moldable felts. Molded felt parts eliminate fabricating problems of stitching, cementing or stapling. They also provide one-piece integrated assemblies at lower cost for superior service where a compact, permeable shaped part is needed which will breathe, cushion, filter, seal, wick or lubricate. Review your material requirements and let our engineers apply this property of felt to your new design projects or to existing parts.

Strip of felt
from the
molding press

American Felt Company

TRADE MARK ®



GENERAL OFFICES: 68 GLENVILLE ROAD, GLENVILLE, CONN.
SALES OFFICES: New York, Boston, Chicago, Detroit, Cleveland, Rochester, Philadelphia, St. Louis, Atlanta, Dallas, San Francisco, Los Angeles, Portland, Seattle, Montreal.—PLANTS: Glenville, Conn.; Franklin, Mass.; Newburgh, N. Y.; Detroit, Mich.; Westerly, R. I.—ENGINEERING AND RESEARCH LABORATORIES: Glenville, Conn.



Actual molded felt part as
delivered to a customer

WRITE for our recommendation of a molded American Felt part to your specifications.



EXTRAORDINARY ANNOUNCEMENT!

of

MARVELS TO BE EXHIBITED
at the

CHICAGO MACHINE TOOL SHOW

International Amphitheatre, Sept. 6-17

SEE THE FAMOUS

NORTON GRINDING MACHINES

INCLUDING

A MULTI-WHEEL GRINDER! A LAPPER! A CAM-O-MATIC!
AND MANY OTHER

WONDERS OF THE MECHANICAL WORLD

SPECIAL ADDED ATTRACTION

AUTOMATION BY NORTON

SEE THE FABULOUS

TRANSFER TYPE CRANKPIN GRINDER

IT LOCATES! IT GRINDS! IT GAGES! IT TRANSFERS!

All Without the Aid of Human Hands!

This amazing aggregation to be seen daily at booth No. 516
Further Particulars Inside





with STAR PERFORMERS F

The grinders and lapper shown here — together with the automated crankpin grinder on the reverse side — will be shown in the Norton exhibit at the Chicago Machine Tool Show — Booth No. 516.

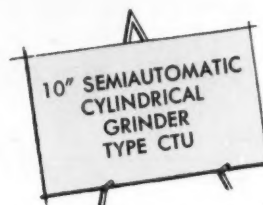
Selecting them was not easy, since every Norton machine is built to deliver "Touch of Gold" performance — the Norton *extra* that adds value to your product while cutting production costs. We chose these because they illustrate, as well as any group of machines can, the broad scope and up-to-the-minute engineering of Norton manufacture.

We want to emphasize, however, that these advanced machines represent only a small fraction of the world's largest line. Besides many models of cylindrical, surface and tool room grinders, Norton produces a wide range of lapping machines, crankshaft and

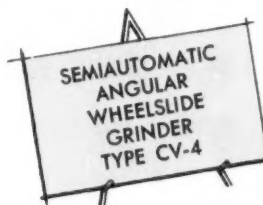
camshaft grinding machines and special types for grinding pistons, valves, jet parts, aircraft propeller hubs, etc.

Here, in short, is the line that offers you the greatest possible opportunities to modernize. Replace your obsolete grinding and lapping equipment with new Norton machines — and meet competition with the best production tools in the field!

Make sure you get complete facts on the types of Norton grinders or lappers in which you're interested. See them at the Show, call your Norton representative, or write direct. And remember, only Norton offers you such long experience in both grinding machines and wheels to help you produce more at lower cost. NORTON COMPANY, Machine Division, Worcester 6, Massachusetts.



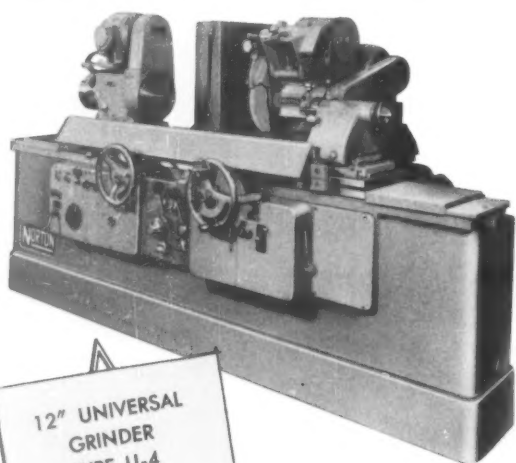
Fast, Flexible, Accurate. An outstanding combination of speed, accuracy, flexibility and ruggedness. Performs plunge or traverse type operations, permitting heavy roughing cuts or finest finishing. Heavy wheel head also accommodates a wide range of multi-wheel mounts. One-lever control of automatic grinding cycle reduces operator's duties to loading and unloading. Production line and job shop users report these machines have doubled production, replaced several machines, eliminated extra operations. Work lengths: 18", 36", 48", 72", 96" and 120".



Eliminates An Extra Operation. Grinds thrust surfaces and adjacent diameters in one fast, automatic plunge grind operation — saving time and labor by eliminating the separate grinds on these areas necessary with conventional cylindrical grinders. Operator merely loads, starts automatic cycle, and unloads. Automatic wheel feed includes a "click-count" index, enabling settings for work diameter reduction in increments as fine as .0001". Automatic wheel guard truing device (optional) reduces wheel cost per piece ground. The CV-4 leaves a concentric grain pattern in the thrust surface finish — assuring a better seal surface and appearance. Work lengths: 18", 36", 48" and 72".



Setting New Standards In Cam Grinding. This new, highly advanced automatic machine is setting new standards for production, precision and finish in camshaft grinding. Solid, rigid construction means minimum vibration, with maximum accuracy and service life. Entire operating cycle is geared to split-second efficiency. Indexing is ultra-smooth, extra-rapid. Automatically compensating work speed arrangement promotes speed and precision performance. Wheel truing is automatic and swiveling wheel slide permits grinding tapers in same or opposite direction on the same shaft.



12" UNIVERSAL
GRINDER
TYPE U-4

Does More Jobs . . . Saves More \$\$\$. Quick, easy set-ups plus

fast grinding action enable this grinder to cut time and costs on a wide variety of external, internal, face and angular wheelslide grinding jobs. Simply turning a dial gives you an infinite number of work speeds over its 40 to 400 rpm range. Other important advantages include: permanent chuck mounting; compound wheel head slide that permits settings for both wheel and feed independently, at any angle; internal grinding spindle of hinged-bracket type, for quick change-over to or from internal grinding; hollow headstock spindle accommodates a bar clear through. Made in 36" and 48" work lengths.

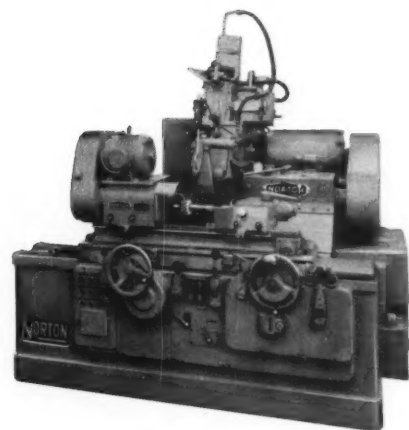


HEAVY DUTY
MULTI-WHEEL
GRINDER
TYPE CM-1

Boosts Production Rates 400%.

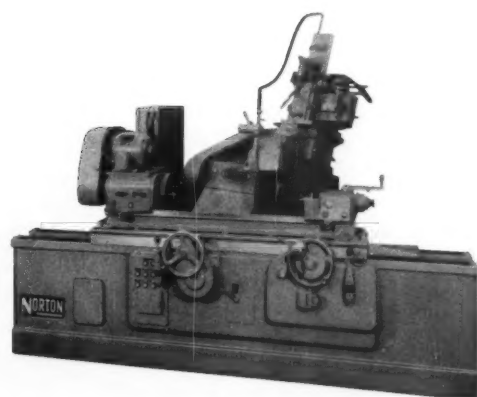
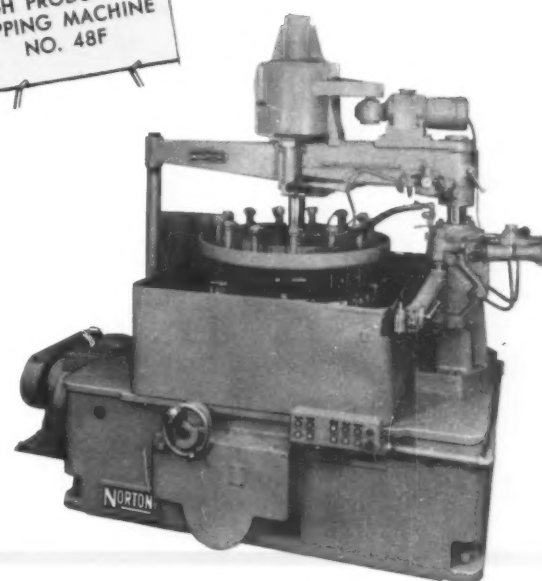
Makes four or more cuts simultaneously, in a single plunge-grind cycle. Brings new economy to the grinding of multi-diameter parts, such as crank and camshafts, transmission and motor shafts. Operates automatically, under one-lever control. Cartridge type spindle bearings assure extreme rigidity of spindle, longer wheel life, greater accuracy with minimum truing. Automatic truing device trues wheels individually, yet all at once. Automatic compensation for wheel wear, including amount trued off, eliminates adjustment or resetting of wheel after truing. Available in 10" x 30" and 14" x 30" sizes.

S FROM THE COMPLETE NORTON LINE



For Speed, Accuracy, Economy. Designed for extremely fast, high production performance of single or parallel face flat lapping. Eliminating loose abrasives, its bonded abrasive laps produce work pieces free of grit or foreign matter. It is available in three arrangements: plain, timed cycle . . . automatic continuous feed . . . semiautomatic continuous feed. Capacity range for single face lapping is up to 3 pieces of 14" diameter, or one 48" piece. Maximum work size for parallel face lapping is 14" diameter x 5" thick.

**HYPROLAP®
HIGH PRODUCTION
LAPPING MACHINE
NO. 48F**



To Economize, Modernize with

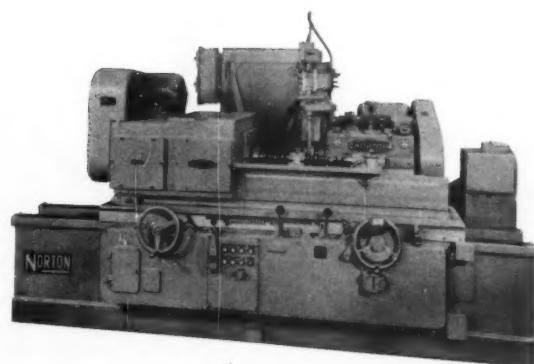
NEW

NORTON

GRINDERS and LAPPERS

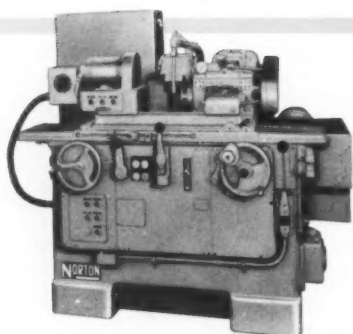
Making better products . . . to make your products better

District Sales Offices: Worcester • Hartford • New York • Cleveland • Chicago • Detroit

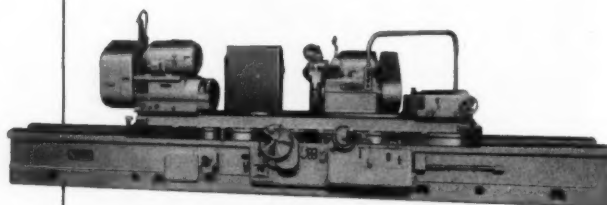


4 MORE PACE-SETTING NORTON GRINDERS

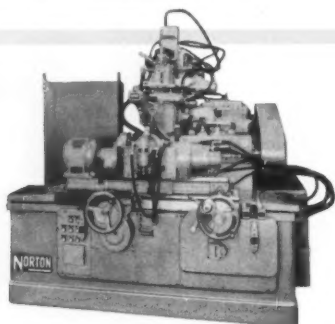
Besides the Norton machines to be shown at Chicago, these four rate high for usefulness and economy — in applications ranging from small cylindrical grinding to heavy duty roll grinding, and from job shop work to special purpose operations.



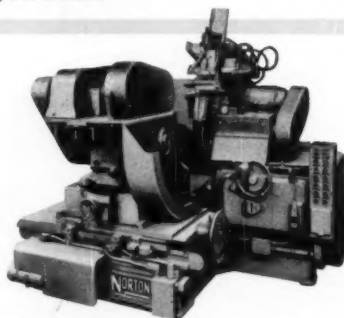
4" x 18" CYLINDRICAL GRINDER-TYPE CTU. A high precision, high production machine that makes small parts pay off big, in jobs ranging from heavy stock removal to fine finishing. Extremely easy to operate and maintain. Available as a plain machine or semiautomatic.



18" x 96" CYLINDRICAL GRINDER-TYPE C-2. A heavy duty grinder that features faster cutting, quicker set-ups and easier operation. Available as a plain, semiautomatic or roll grinder. One-lever control of grinding cycle on the semiautomatic. As a roll grinder it includes the famous Norton tilting wheel head.



FULL AUTOMATIC-TYPE CTU. Ideal for high production, low cost grinding of concentric cylindrical parts held between centers. Automatic wheel truing greatly assists high output. Automatic compensation of wheel head setting after truing available at extra cost.



42" HI-SWING SEMIAUTOMATIC CHUCKING GRINDER. Designed especially for fast, accurate grinding of large diameter, short parts — such as jet engine wheels and other chucking work — particularly where both external and internal grinding are required. Its automatic functions assure a predetermined, consistent rate of output.

The Norton Machine Lease and Purchase Financing Programs

If the cost of replacing obsolete equipment with new grinding or lapping machines is delaying your plans for modernization, investigate the Norton Machine Lease Program — three tested plans that enable you to modernize while conserving your capital. Or look into the Purchase Financing Plan, under which you may take up to five years to pay for income-producing equipment. Get full particulars from your Norton representative, or write direct.





Now... Machining and Heat Treating

In *One* Operation!

with TOCCO Induction Heating

Mechanics Universal Joint Division of Borg-Warner Corporation now combines automatic heat-treating and metal-working operations on the same machine!

A Tocco Inductor Coil, matched to one spindle of a multiple spindle automatic screw machine, heat treats the inside diameter of automotive trunnion cups—after they have been completely formed on the same machine tool. Twenty-two, 20 and 50 kw, 450,000 cycle TOCCOtron Induction Heating units and 44 automatic screw machines (installed here and in other plants) make up this high-speed production team.

THE OHIO CRANKSHAFT COMPANY
Dept. M-9, Cleveland 1, Ohio

This new method permits the use of SAE 1144 steel and eliminates costly, time-consuming copper plating and carburizing operations formerly required. Heating and quenching cycles total approximately 10 seconds per part, and production is in excess of 300 parts per hour from each machine.

If your products or their components require heat treating, soldering, brazing or forging it will pay you to investigate TOCCO for better, faster ways of producing them at lower unit cost.

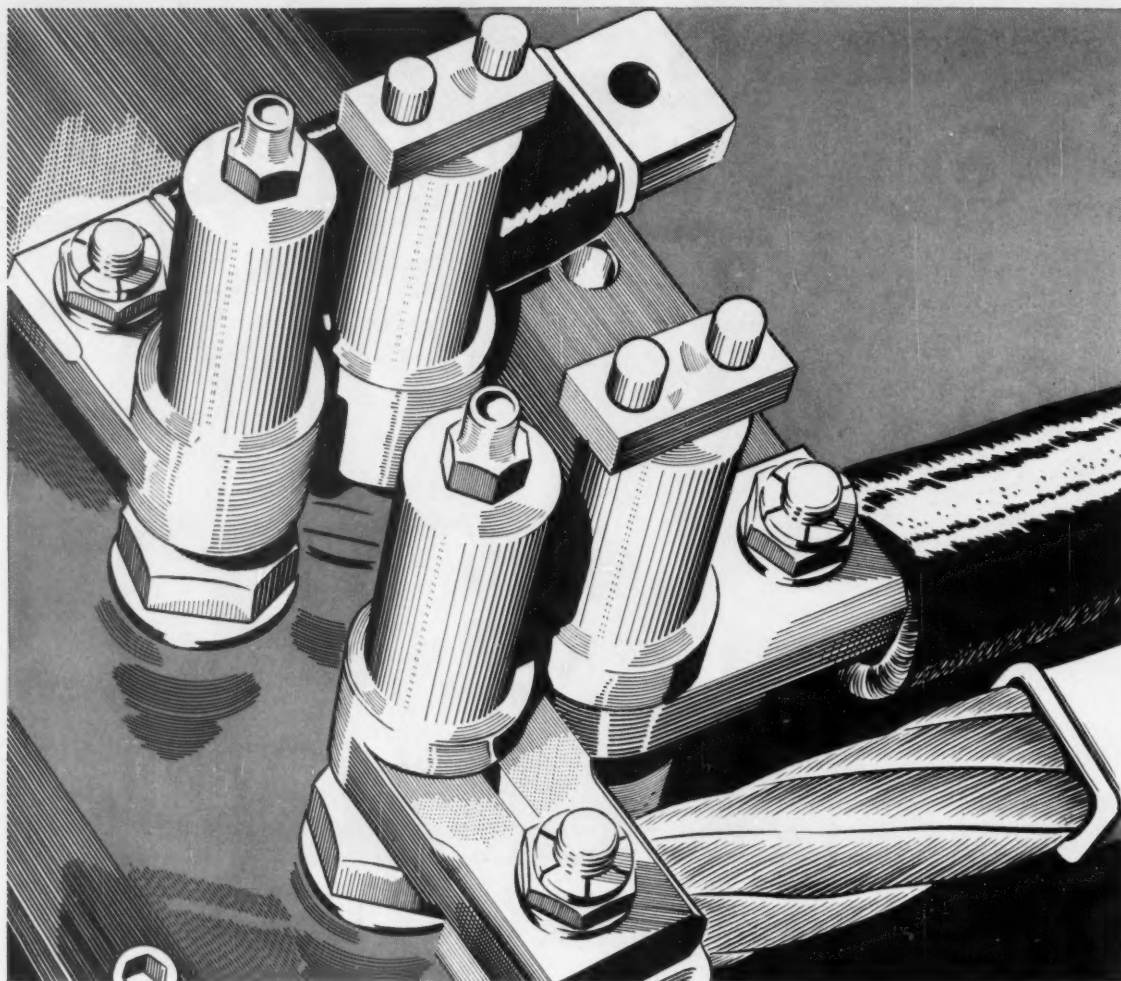


TOCCO



SEE this application
in operation at
Cone Automatic Machine Co.
BOOTH 401
National Machine Tool
Builders' Show
CHICAGO—Sept. 6-16.

FLEXLOC AT WORK



DESIGNER OF WELDING DIE uses one-piece, all-metal thin FLEXLOCs as stop nuts on flexible cable assembly. Although the assembly swivels, FLEXLOCs won't work loose.

Nuts that loosen cause trouble. Contact is poor; flow of current erratic; welding faulty—and faulty welding means inferior finished jobs.

Don't take any chance of nuts loosening on vital assemblies. FLEXLOCs are made to stay put. And they are available in a wide range of sizes, types and material. See your authorized industrial distributor for Bulletin 866 and samples. Or write STANDARD PRESSED STEEL CO., Jenkintown 19, Pa.

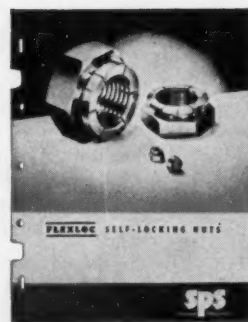
Use FLEXLOCs anywhere safely

ON ROUGH BOLTS. They'll smooth out bolt threads without damaging the threads of the nut.

IN TEMPERATURES TO 550°F in plated nuts and even higher in unplated ones. High temperatures do not affect FLEXLOCs. Nuts with non-metallic inserts fail under such conditions.

AS STOP OR LOCK NUTS. After at least 1½ threads of a standard bolt are past the top of the nut, the FLEXLOC stays put.

REGARDLESS OF MOISTURE, OIL, DIRT OR GRIT. None of these conditions make any difference to a FLEXLOC, and vibration won't loosen it.



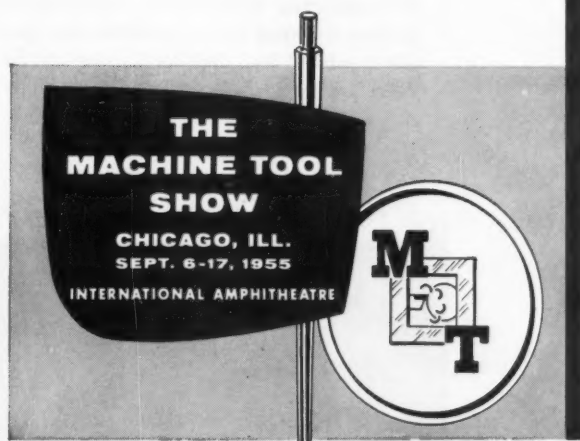
FLEXLOC
LOCKNUT DIVISION

SPS
JENKINTOWN PENNSYLVANIA

MODERNIZATION ... in ACTION!

PRATT & WHITNEY

**SPACE
1219**



SEE...

NEW No. 2E Vertical Precision Hole Grinder
No. 3C Die Sinker
Velvetrace Milling Machine
BL 3622 Model C Keller Machine
BG-21 Keller Machine
48" Vertical Rotary Table
24" Plain Optical Rotary Table
42" Plain Rotary Table with Automatic Positioning
Potter & Johnston Automatic Turret Lathes
Sigmatic Gaging Machines
"Automation" Gages and Feed Back Controls

ALSO Model "C" Toolroom Lathe
Vertical Die and Surface Grinder
Universal Die Sinker
Electrolimit Jig Boreers
End Measure Type Jig Borer
Kellerflex Machines and Burs
Pneumatic Grinding Head
Plain, Tilting and Vertical Rotary Tables
Comprehensive Display of Precision Cutting Tools
Comprehensive Display of Standard Gages and Comparators

PRATT & WHITNEY

DIVISION NILES-BEMENT-POND COMPANY
WEST HARTFORD 1, CONNECTICUT, U.S.A.

FIRST CHOICE FOR ACCURACY
SINCE



MACHINE TOOLS • CUTTING TOOLS • GAGES
1860



*now you can save valuable
one operation ahead... with*

Carlton

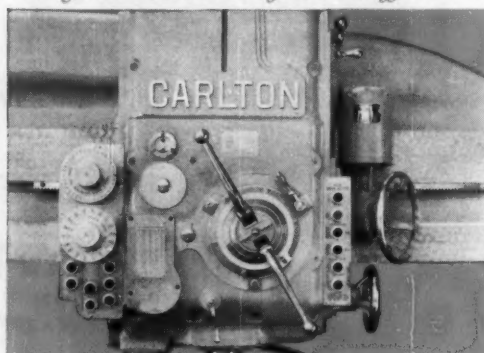
The new Carlton-Leber speed-feed pre-selector system speeds up drilling by permitting operator to set speed and feed for the next operation while the machine is still under cut. With this productive new device, the time lost heretofore in setting speeds and feeds is now used for almost continuous drilling. Now you stop the spindle only for changing cutting tools.

Pre-selector Here's how it works: while the machine is cutting on one operation, the operator sets speed and feed dials for the next operation. When present operation is complete, he stops the

Carlton Radial Drills now come with your choice of 3 different



1 Manual gear shift: 2 shifter levers for controlling speeds, 2 shifter levers for controlling feeds.



2 Pre-select gear shift: 1 speed graduated dial and 1 feed graduated dial pre-set speeds and feeds.

*drilling time by giving operator a chance to set
the new*

pre-selector

spindle, changes the drill, and starts spindle again. At that instant, the gears automatically shift to the correct speed and feed.

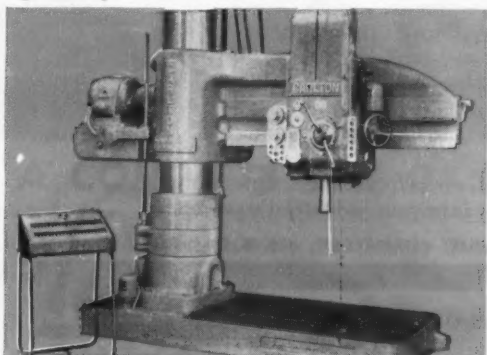
Additional time is saved by instantaneous gear shifting made possible by mechanically oscillating the change gears which assures quiet gear mesh.

Programming Another Carlton-Leber system—the programming unit—can be used in connection with the pre-selector. The programming system pre-selects speeds and feeds for an entire drilling program including as many as 20 or 30 operations.

With the introduction of the Carlton-Leber pre-selector and programming systems, you can now buy Carlton radial drills with your choice of three different types of speed-feed control as illustrated below.

Be sure to see the new Carlton-Leber pre-selector and programming devices in action at the Machine Tool Show in Carlton booth 919. In the meantime, write for your descriptive bulletin. The Carlton Machine Tool Co., Cincinnati 25, Ohio, U.S.A.

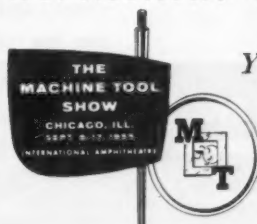
speed-feed controls . . .



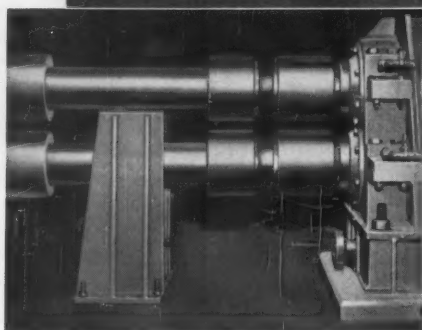
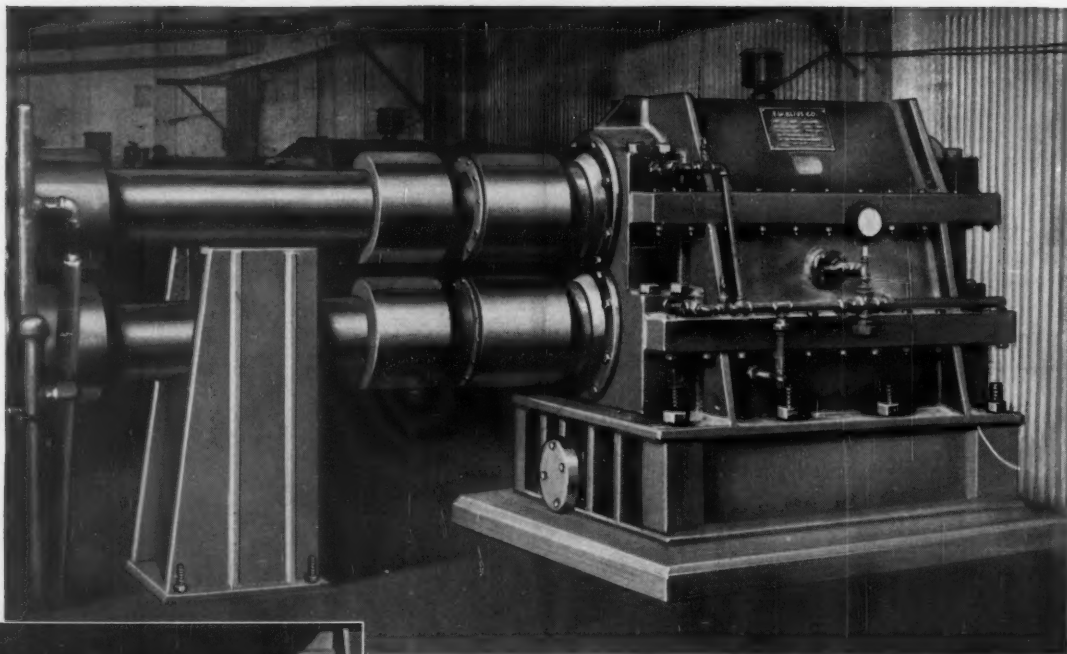
3 Pre-selector and programming gear shift sets up correct speeds and feeds for a complete sequence of operations.

Carlton

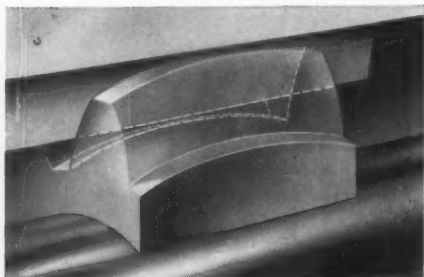
horizontal and radial drills



You're invited . . . to see the new Carlton-Leber pre-selector and programming devices. Visit us in booth 919 at the Show.



Four stand tandem cold reduction mill built by E. W. Bliss Company, of Salem, Ohio. Equipped with eight "Sphereflex" roll shaft couplings, two couplings per stand, each coupling rated 750 HP at 50 RPM.



Cut above shows curved root and spherical tooth flank, which will compensate for any and all types of misalignment.

"SPHEREFLEX" ROLL DRIVE COUPLINGS

The E. W. Bliss Company, Salem, Ohio, chose the "Sphereflex" spindle roll coupling in its design of a 4-Hi mill. Designed for 6° angularity the couplings above offer higher efficiency, lower replacement cost and reduced maintenance than old style couplings.

EXCLUSIVE "SPHEREFLEX" TOOTH DESIGN PERMITS MAXIMUM ANGULAR CAPACITY WITH MINIMUM BACKLASH—PERMITS CONSTANT LINEAR ROLL SPEED WITH IMPROVED OPERATING EFFICIENCY.

The Sphereflex tooth, incorporating a curved pitchplane having a constant chordal thickness, results in a modified ball and socket joint so necessary for high operating efficiency of rotating equipment.

For industrial applications, there is a complete range of standard gear couplings utilizing the new "Sphereflex" tooth form. These standard "Sphereflex" couplings are priced competitively with ordinary commercial gear couplings.

Let Phillie Gear help you design greater efficiency and life into your industrial equipment.

SEND FOR "SPHEREFLEX" CATALOG C-540, AND BE CONVINCED.

PHILADELPHIA GEAR WORKS, INC.

ERIE AVE. & G ST., PHILADELPHIA 34, PA.
NEW YORK • PITTSBURGH • CHICAGO • HOUSTON • LYNCHBURG, VA.
Virginia Gear & Machine Corp. • Lynchburg, Va.



Industrial Gears & Speed Reducers

LimitTorque Valve Controls

Established 1892

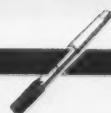
BUTTERFIELD



A COMPLETE LINE OF QUALITY cutting tools is now available from your Butterfield distributor. Milling Cutters are made to the same exacting standards as Butterfield Taps, Dies, Drills, Reamers, Counterbores and End Mills.

UNION TWIST DRILL COMPANY
BUTTERFIELD DIVISION
DERBY LINE, VERMONT, U. S. A.

FOR FAST, ECONOMICAL SERVICE
CALL YOUR **BUTTERFIELD**
DISTRIBUTOR



NOW!

A COMPLETE LINE OF STANDARD CARBIDE TIPPED COUNTERBORES



Standard tungsten carbide tipped cutters in both Pin and Radial Drive are now carried in stock for immediate shipment. Diameters range from $\frac{3}{8}$ " to 2" in $\frac{1}{16}$ th sizes, and from 2" to 3" in $\frac{1}{8}$ th sizes.

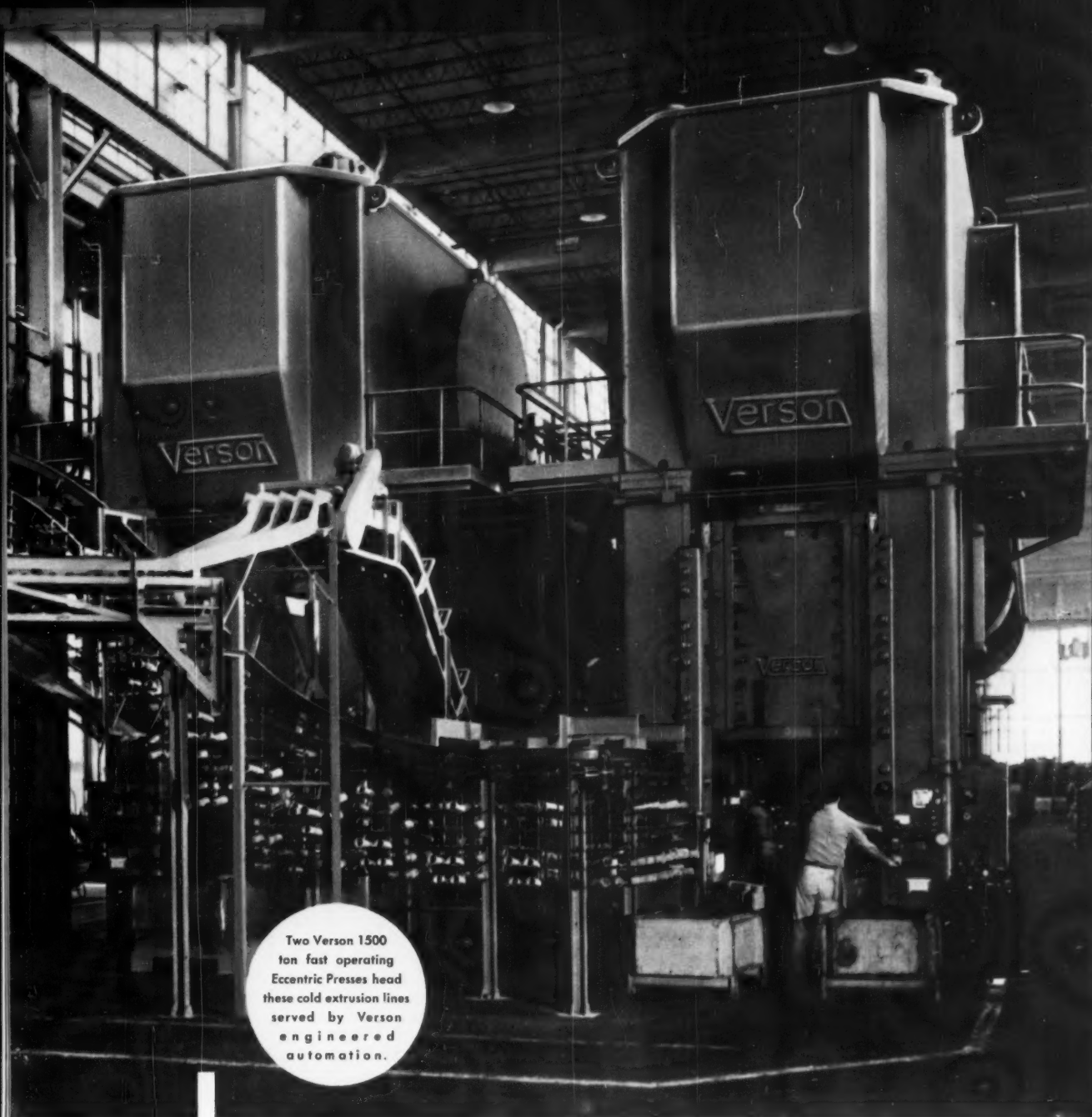
Improved flute design provides better chip disposal and longer carbide tips insure longer tool life. Minimum root diameters permit the use of a greater range of standard Eclipse Pilots.

Special carbide tipped tools in various drives will be quoted on request.



ECLIPSE COUNTERBORE COMPANY

1600 BONNER AVE., DETROIT 20, MICHIGAN



Two Verson 1500
ton fast operating
Eccentric Presses head
these cold extrusion lines
served by Verson
engineered
automation.

Anyone can build a press...



**builds production processes
that lower your unit costs...**

TURN
THE PAGE
FOR MORE

Imagination...ingenious tooling...

THE



**COMBINATION THAT ASSURES
BETTER STAMPINGS AT**

Anyone can build a press . . . it's what that press can be made to do that is important. At Verson, press and tooling design problems are approached with imagination. To just build a press isn't enough . . . it is our constant goal to seek and find better and more efficient means of production even if it means a complete departure from conventional practices.

We are proud of the many advances in the art of press forming metals that this philosophy has made possible. Starting with the first welded steel frame, Verson imagination has led to many revolutionary developments . . .

larger, more efficient presses . . . completely automatic Transmat forming . . . higher speed, progressive forming . . . perfection of the Wheelon process of rubber pad forming . . . extrusion of artillery shells.

Shown on these pages are just a few examples of how Verson imagination, combined with quality presses and ingenious tooling has made possible superior production processes. We would like the opportunity to show you what Verson imagination can do when applied to your production problems. It may open the door to improved efficiency and lower costs for you.



...fine presses

LOWER COST



ABOVE—In modern production processes, tooling is often the key to more efficient production. Verson has led the way in the development of cost-cutting tooling and automation.

LEFT—A small part of a large component manufacturing plant that is 100% equipped with Verson Presses. 47 Verson machines are now installed and preparations being made for 7 more. Key Verson units are a group of 2500 ton double action presses.

RIGHT—Verson-Wheelon direct acting hydraulic presses have revolutionized rubber pad forming processes. Not only have they reduced initial investment, but they permit use of higher forming pressures and produce far superior parts. The press shown has a rated capacity of 21,000 tons.

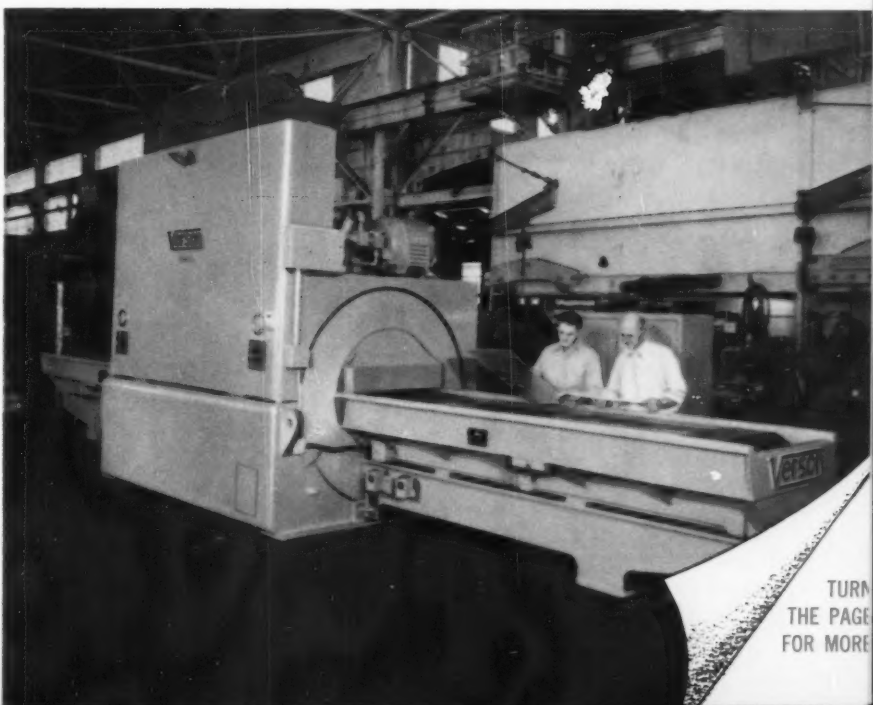
Open House

at Verson
during the Machine Tool
Show, September 6 to 17—

You are cordially invited to visit the Verson plant while you are in Chicago for the Machine Tool Show. Verson presses will be in operation for your examination in our new Research, Development and Exhibit Center. Transportation can be arranged from the Show or from your hotel.



ABOVE—Transmat forming is the Verson concept that has revolutionized mass production of stampings requiring four or more operations. The Transmat Press shown is a good example. It is part of a Verson tool-up for automatically producing 1000 automotive air cleaner shells per hour.

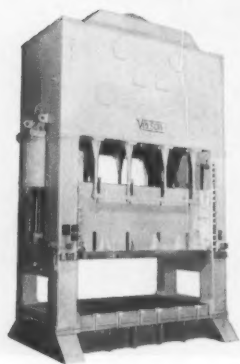


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FOR MORE

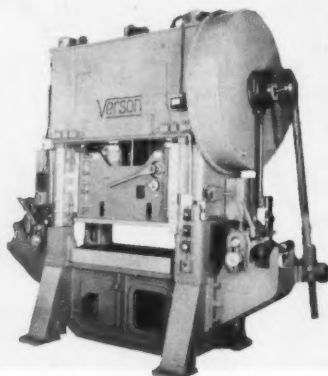
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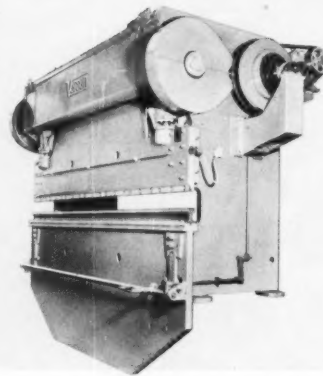
PRESS FOR EVERY JOB FROM 60 TONS UP



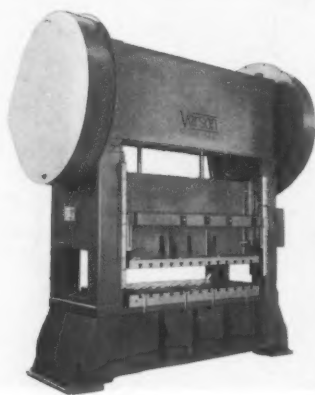
Verson Straight Side
Eccentric Presses



Verson High Speed,
High Production Presses



Verson
Press Brakes



Verson Straight Side
Crank Presses



Verson
Transmat Presses



Verson
Hydraulic Presses

● The complete Verson line includes not only the presses illustrated on these pages but virtually all other types as well, including an extremely wide variety of special machines. More than thirty years of research and development are behind today's Verson Allsteel Presses. Incorporating all the advanced engineering features that have won them their reputation for top quality performance, Verson Presses are constantly being tested, refined and improved so that they may continue to lead the way in making possible improved processes.

Whatever your production problems, if they involve the press forming of metals, bring them to Verson. Here your press requirements will be treated as an integrated part of your whole production process. As a manufacturer of practically every type of press we can recommend, without prejudice, the combination of machines that will best fit your overall requirements.

To put these facilities to work for you, just send an outline of your needs.



ORIGINATORS AND PIONEERS OF ALLSTEEL STAMPING PRESS CONSTRUCTION

VERSON ALLSTEEL PRESS CO.

9300 S. KENWOOD AVENUE, CHICAGO 19, ILLINOIS • SO. LAMAR AT LEDBETTER DRIVE, DALLAS, TEXAS

MECHANICAL AND HYDRAULIC PRESSES AND PRESS BRAKES • TRANSMAT PRESSES • TOOLING • DIE CUSHIONS • Verson-WHEELON HYDRAULIC PRESSES

PRINTED IN U.S.A.

How Farval lubrication makes a turbine behave!

**FARVAL—
Studies in
Centralized
Lubrication
No. 171**

THIS hydraulic turbine had costly maintenance problems. Every few months, 6 to 8 expensive bearings had to be replaced. Old-fashioned grease gunning just couldn't keep lubricant in bearings. Repairs interfered with electric power production.

Farval Lubrication Engineers were called in. A Farval System of Centralized Lubrication exactly suited to the turbine's needs was recommended. Result—lubrication troubles ended. Downtime was eliminated. Now, even bearings under water keep working properly. Farval works as the turbine operates—no time out for lubrication. Manpower is saved, because Farval is wholly automatic. Important money is saved. In 14 years, the manager reports thousands saved in bearings and lubricant. These savings led to Farval Systems on 9 other turbines.

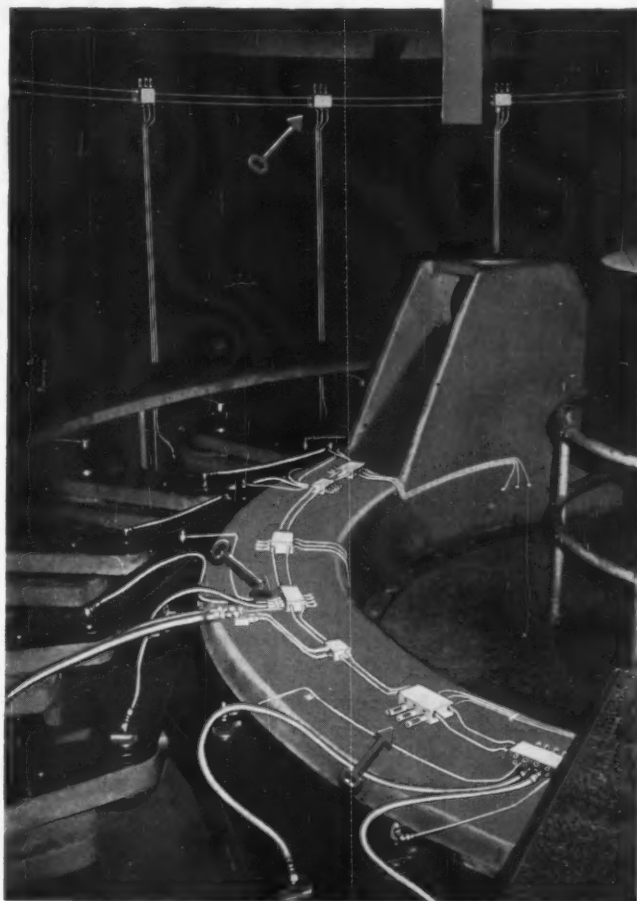
Farval saves in many industries

This is a typical example of the economies Farval brings to industrial equipment. Farval is a simple, dependable system that lubricates quickly, without shutdown, from one central pumping station. Oil or grease is delivered unfailingly, to each bearing served, in the exact amount *when* required. And, Farval Centralized Lubrication Systems, manual or automatic, can be installed on new or old equipment.

Free Bulletin tells you all

Find out how Farval can save for you and pay for itself in quick order. Write for helpful technical advice and ask for Bulletin 26. The Farval Corporation, 3276 East 80th Street, Cleveland 4, Ohio.

Affiliate of The Cleveland Worm & Gear Company, Industrial Worm Gearing. In Canada: Peacock Brothers Limited.



KEYS TO ADEQUATE LUBRICATION—Wherever you see the sign of Farval—the familiar valve manifolds, dual lubricant lines and central pumping station—you know a machine is being properly lubricated. Farval manually operated and automatic systems protect millions of industrial bearings.

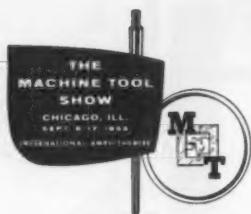


Exhibit No. 1414

Bliss unveils four new lines of metal working presses

Many innovations in auxiliary equipment to be revealed for the first time

VISITORS to the Machine Tool Show in Chicago will be able to witness operation of newly-designed inclinable, straightside, knuckle joint and high production presses — each representative of complete new press lines by Bliss.

In addition to the four new press lines, Bliss will also exhibit such important new developments in auxiliary equipment as its new Automation Control Switch, a new combination air friction clutch and brake, new feed mechanisms, and a host of other up-to-the-moment designs.

What promises to be an outstanding attraction of the Bliss exhibit, however, will be its premiere showing of four new color and sound movies on the subjects of press maintenance, automotive and appliance industry uses of Bliss-designed transfer feed presses, and on the Bliss-Crary Tonnage Limitor — a new and unusual "overload" device.

For those who intend to visit the Show, the contents of the Bliss exhibit are briefly described here with the hope that it will help them decide what they would particularly like to see, and thus help them make the most of their limited time. For those unable to attend, full particulars on all described here are available on request.

New line of enclosed inclinables with air friction clutches . . . A complete new line, ranging from 75 to 200 tons, will be represented at the Show by a 75-ton model. These are extra-heavy presses: frames are totally-enclosed and they have box-type crowns. All electrical, air and lubrication controls are housed within flush-fitted panels in the frame. Other features include: air friction clutches, motorized slide adjustments and inclining mechanisms, automatic return oil lubrication, bronze liners in the slide, heavy wrist-type connections, and extra-long gibbing. All die space dimensions and controls conform to JIC standards.

Streamlined, enclosed coining press has new wedge-type adjustment . . . Bliss' new line of coining presses will be represented at the Show by a 400-ton model which will be set up to strike souvenir Bliss medallions. Most outstanding feature of the press is its new motorized wedge-type adjustment which eliminates the need for a separate top lock device and compression springs. The new press is streamlined in appearance, and its controls are neatly housed in semi-flush panels. Two independent lubrication systems are now utilized in Bliss coining presses — one to circulate cascade type lubrication to the knuckles and the other for remainder of the press bearings.

new ideas highlighted in —

PREMIERE SHOWING OF FOUR MOVIES FOR PRESS USERS

These movies will be run in the Bliss exhibit on an around-the-clock basis. A movie "time-clock" will tell you when the one you want to see will begin. After the Show, all movies will be available upon request for showing to your own personnel.

Power Press Maintenance . . . The picture was developed for instruction of personnel responsible for the upkeep of presses. It shows correct procedures for set-up of new Bliss straightside and inclinable presses . . . describes proper lubrication, inspection and maintenance methods; tells how to check and adjust slide alignment, how to adjust ball joints . . . bearing clearances . . . clutches . . . and also describes free counsel available through Bliss' new Preventive Maintenance Program.

Bliss' 1000th transfer feed press . . . Viewers see how this 250-ton transfer feed press performs 11 separate operations on 5" steel blanks and produces finished auto starter brush end plates — all automatically. The dial feed, the dies required in each of the 11 stations, and the electrical interlocks that protect the press

against misfeeds are all carefully explained.

Transfer feed presses in the appliance industry . . . Shows how a large appliance manufacturer uses a 700-ton Bliss transfer feed press to turn out refrigerator shelves and crisper pans from coil stock. Shows every step from the coil through the series of dies to the finished pans. The transfer feed mechanism alone makes it well worth the watching.

The Bliss-Crary tonnage Limitor . . . This movie explains a new device designed to protect presses from overloads at every point of the stroke. It reveals that, unlike earlier devices, the Limitor adjusts itself automatically to changing press capacity characteristics at different parts of the press cycle. How it's done is explained in the film in detail.

High production press has new feed, new lube system . . . A new Bliss 60-ton H-P press, capable of making more than 450 stampings per minute, represents the new line at the Show. The feeds have been redesigned and now incorporate a new rack and pinion feed drive, an anti-friction overrunning feed clutch, and a newly-designed scrap shear. Another change has been in the press legs. In its left leg have been housed its air controls, and in the right is the "heart" of a completely new return oil lubrication system — a large oil reservoir, filters and pump. Controls have been removed from the press and mounted instead on a pedestal base.

"Packaged" straightside presses: controls, piping and wiring part of the package . . . The 250-ton straightside two-point press exhibited at the show, "baby" of the line, is typical of six new lines of "packaged" presses designed by E. W. Bliss Company to aid the stamping industry in its swing towards automated production. Presses in the line, two of which are "under-drives", embody JIC specifications; are shipped

ready to be installed. About all that needs to be done is plug in air and electrical lines. Putting all pipes, wires and controls in uprights leaves clean, uncluttered exterior, and speeds maintenance. Other features include automatic recirculating oil systems, motorized plunger and blankholder adjustments, and high speed air or electric clutches—and Bliss' new Automation Control Switch for doper, kickers, lifters, Iron Hands and the like.

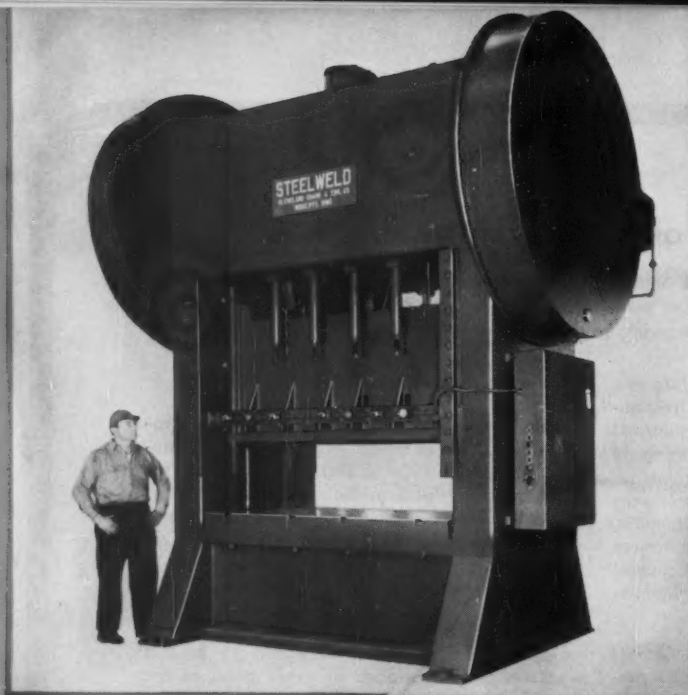
In addition . . . Bliss will take the wraps off its new Automation Switch, a new electro-mechanical nine-station rotary limit switch whose major advantage is the fact that despite its simplicity of adjustment and operation, it is accurate within less than *one degree*.

Also shown will be the details of Bliss' new crankshaft mounted combination air friction clutch and brake . . . new developments in die sets and die springs . . . new feeds and feed components . . . and a host of other developments, many of which may be of immediate and pressing interest to you. You're cordially invited to drop by the Bliss Exhibit, No. 1414, and see the latest developments in the pressed metal industry.

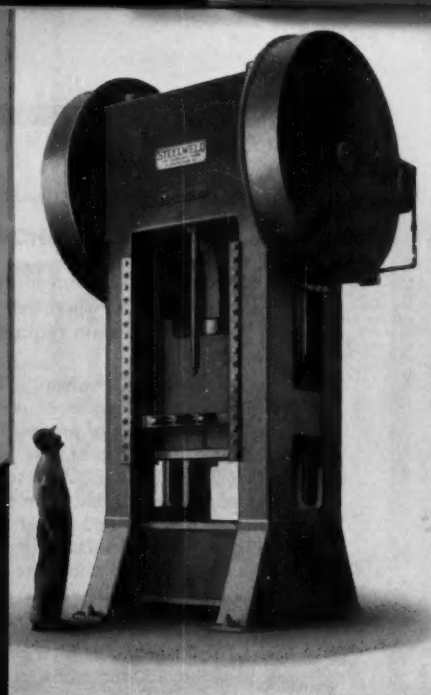


is more than a name... it's a guarantee!

E. W. BLISS COMPANY, Canton, Ohio
PRESSES, ROLLING MILLS, SPECIAL MACHINERY

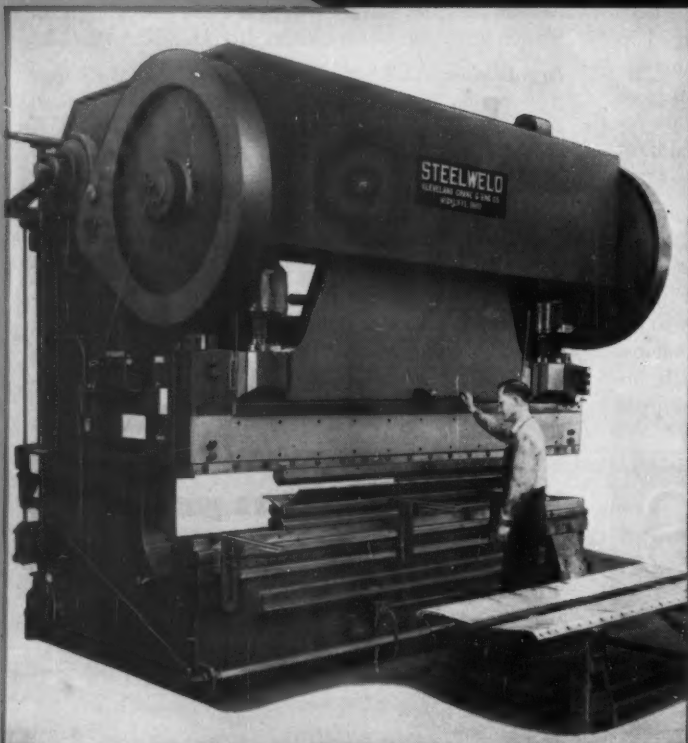


Two-Point Straight-Side Press

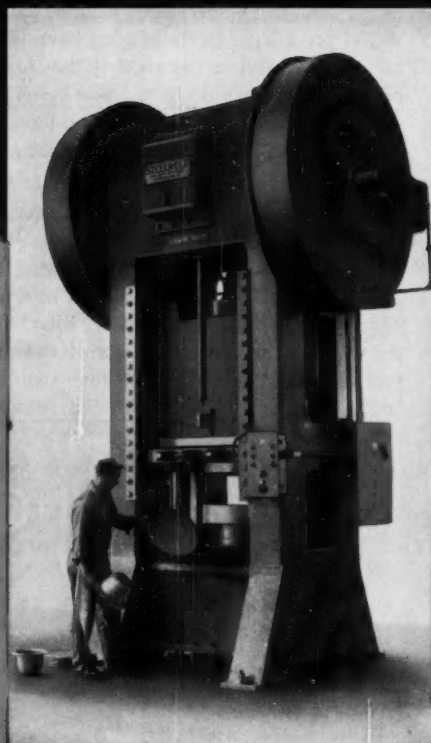


Single-Point Twin-Drive

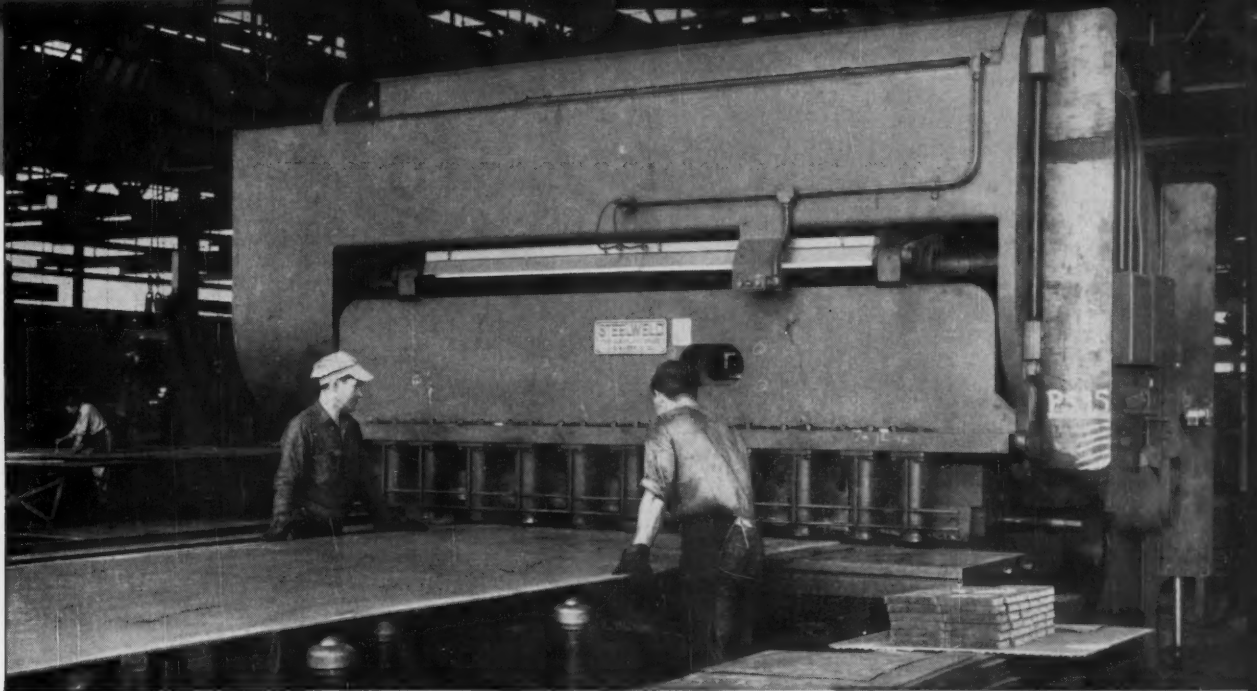
STEELWELD PRESSES and SHEARS



Steelweld Bending Press



Single-Action Hi-Draw



Pivoted-Blade Shear

A BROAD LINE of Steelweld Mechanical Presses and Shears is available to serve you. All machines are built for heavy duty, continuous operation. Latest features required for high-speed, mass-production runs are provided. Design is generous throughout for long life and low maintenance.

Steelweld forming presses range in size from 150 tons up. Bending presses and shears available for plate thicknesses to $1\frac{1}{4}$ " and lengths to 24'-0".

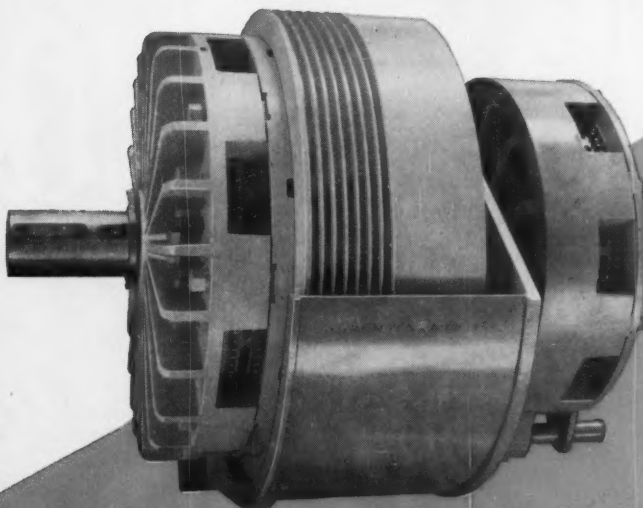
Descriptive information giving details on any or all of the machines illustrated will be gladly sent upon request.

Representatives in all principal cities

THE CLEVELAND CRANE & ENGINEERING CO.

5461 East 281 Street • Wickliffe, Ohio

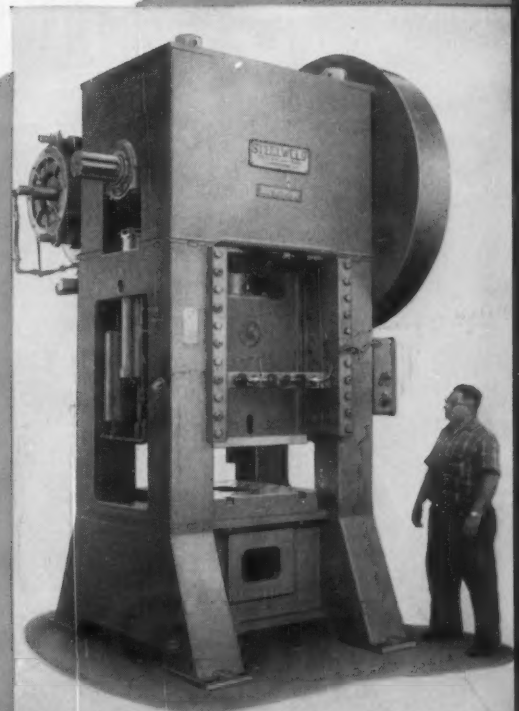
Single-Point Single-Drive





Outstanding **UNITIZED** Clutch and Brake

Steelweld's own air-operated design, with low inertia and fast heat dissipation, has been fully proven under rigorous condi-


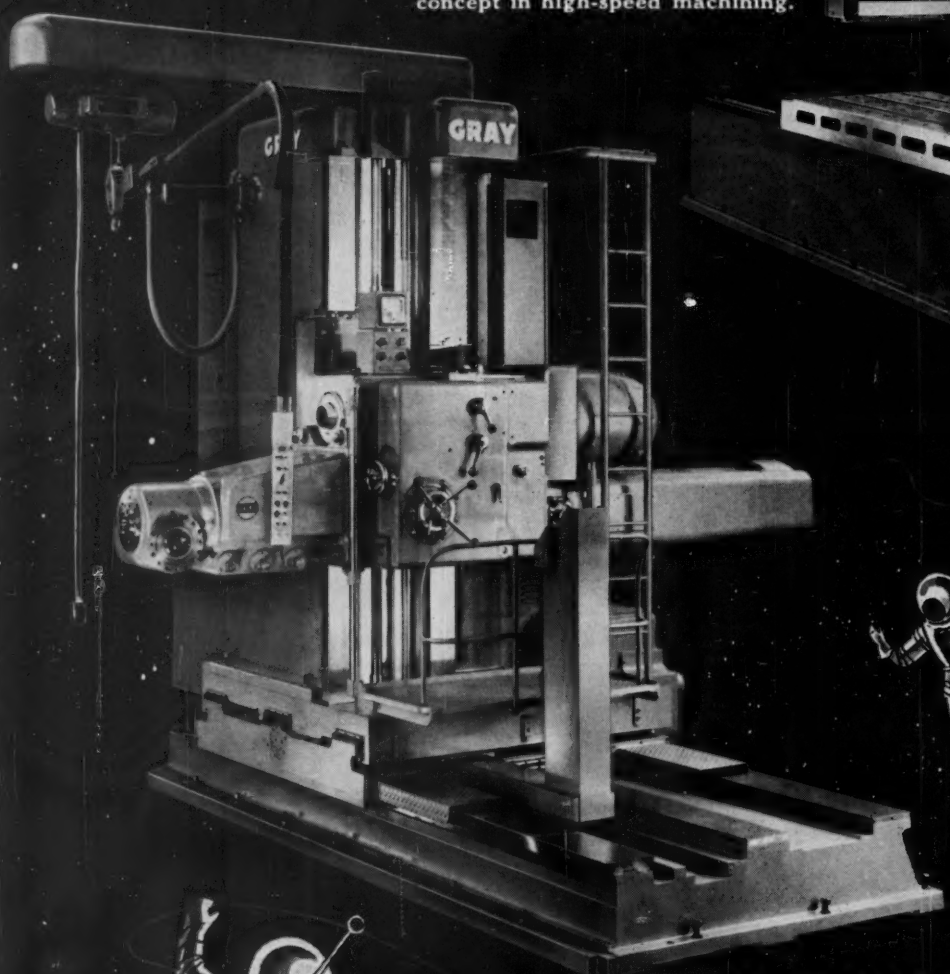
tions. Clutch, brake and flywheel are built together as a unit for quick, easy removal or replacement.



SEE OUR EXHIBIT AT THE MACHINE TOOL SHOW
SPACE NO. 1418
INTERNATIONAL AMPHITHEATRE, CHICAGO



The new GRAY Universal Planer —
single cuts, double cuts, triple cuts,
and cross cuts — a revolutionary
concept in high-speed machining.



The new GRAY Horizontal
Boring, Drilling and Milling Machine —
brute power and great precision
with versatility unlimited.

GRAY

is out of this world

Out-of-this-world thinking has produced down-to-earth features that speed handling, loading, maintenance and, of course, machining. Booth 1120 at the Machine Tool Show will show you why . . .

a Gray will pay.

The G. A. GRAY Co.,
Cincinnati 7, Ohio



The new GRAY Handymill — at
long last a powerful, rigid milling
machine for the medium size job.



*The man who needs a new
machine tool and doesn't buy it
is paying for it anyway...*

**in obsolete
techniques**

How can you tell when a machine or a process is obsolete?

Suppose you buy another machine of the same model that has been doing a satisfactory job. Do you know whether a different, more recently developed machine tool would do your work more accurately, faster, cheaper?

There is one sure way to keep up on developments and improvements—talk frequently to machine tool builders. Discuss your problems with their field engineers. It is their business to help you—to give you the benefit of their specialized experience.

Take Microhoning*, for example. Each year sees tremendous strides in applying this low-velocity abrading process to the problems of industry, through new machines and new techniques developed as new problems arise. Micromatic maintains the world's largest staff of honing specialists and has been responsible for every major development in honing in the past 25 years.

So if you're not in close touch with our representatives as well as with other tool engineers, you may be paying now, in obsolete techniques, for the new machine tools you don't have.



PART:

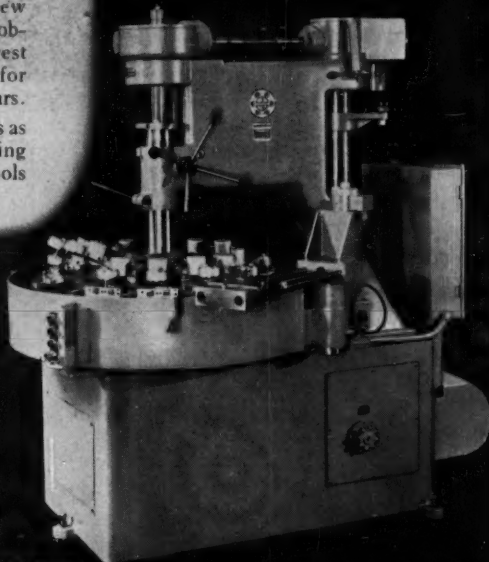
Valve body (automatic transmission)
of die cast aluminum.

PROBLEM:

To produce flat surfaces that will
hold a seal when assembled without
gaskets. High production required.

SOLUTION:

Microhoning removes .001"-.002"
stock to generate flatness within
.0002" and mat finish that hold
required pressure. Production 1200
parts per hour.



*MICROHONING = STOCK REMOVAL + GEOMETRY + SIZE CONTROL + SURFACE FINISH

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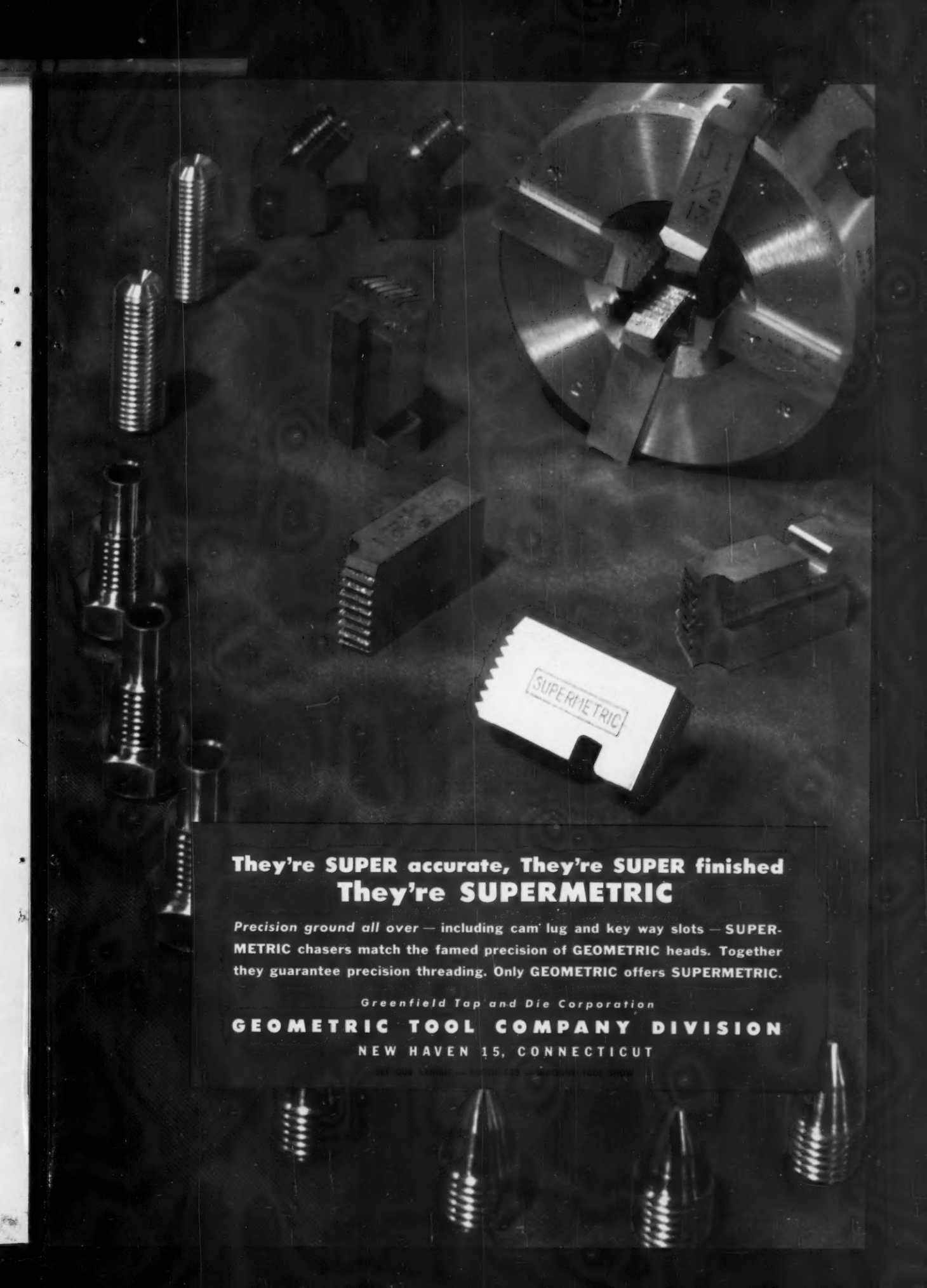
MICROMATIC HONE CORP.
MICRO-HOLD MFG. DIV.
231 So. Pendleton Avenue
Pendleton, Indiana

MICROMATIC HONE LTD., 330 Grand River Avenue, Brantford, Ontario, Canada
REPRESENTATIVES: Allied Northwest Machine Tool Corp., 1222 S. E. 7th Ave., Portland 14, Oregon • Mason Machine Tool Company,
415 South Second East, Salt Lake City, Utah • Parline Machinery & Supply Co., 1921 First Ave. South, Seattle 4, Washington
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MICRO-PRECISION DIVISION • 2205 Lee Street, Evanston, Illinois
Hydraulic controls • Diesel fuel injection equipment

Visit Booth 1211 at the Show.
See demonstrated how Microhoning
replaces obsolete techniques.





**They're SUPER accurate, They're SUPER finished
They're SUPERMETRIC**

Precision ground all over — including cam lug and key way slots — SUPERMETRIC chasers match the famed precision of GEOMETRIC heads. Together they guarantee precision threading. Only GEOMETRIC offers SUPERMETRIC.

Greenfield Tap and Die Corporation

GEOMETRIC TOOL COMPANY DIVISION

NEW HAVEN 15, CONNECTICUT

GET OUR CATALOG — WRITE T-23 — GEOMETRIC TOOL COMPANY

Now Ready —



CATALOG
AND
HANDBOOK

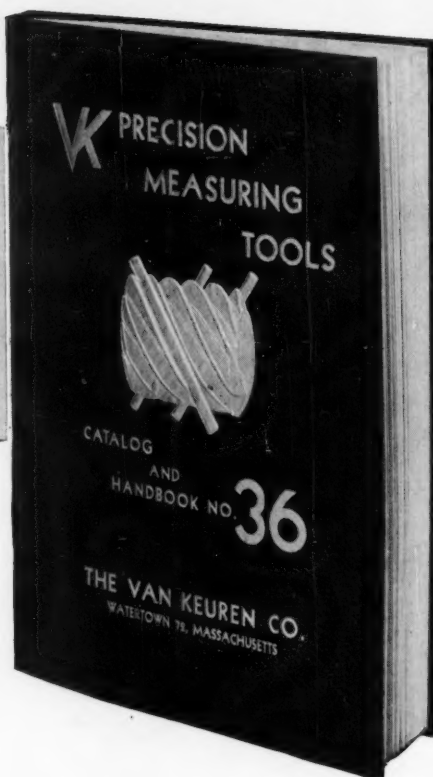
No. 36

New and Revised Edition containing valuable, practical and exclusive Engineering and Production Data on Precision Measurements

This universally known and respected technical handbook contains 258 pages of practical information in ready reference form on precision measurements. We believe it to be the most complete text and tables on wire measurement of screw threads and gears in existence. In addition to the formulas, revised tables, technical material, products and procedures previously included, the new handbook features the following:

New Engineering Data:

1. Vogel Exact Equations for the wire measurement of screw threads, including those of unknown profile.
2. Vogel Master Approximate Formula for screw thread measurement and numerical examples.
3. Consolidated Gear Tables . . . K and M values for two or more wire diameters.
4. Circular Pitch wire sizes.
5. Information on the wire measurement of enlarged pinions, reduced gears and helical gears.
6. Change (K) Factors for helical gears.
7. Tables for pin measurement of sprocket teeth.
8. Pin measurement of face gears.



9. Unified Thread form and series.
10. Tables on measurement of Buttress threads.
11. Gear and Thread measuring bibliography.
12. Optical Flat specifications.
13. Seal Ring Measurements.
14. Use and care of gage blocks.

New Products:

Light Wave Equipment for the shop.
Quartz Optical Flats to 16" diameter.
Microgages in .000008" accuracy; 81-block sets.
Class XXX (.000010" tolerance) Plug Gages.
Chrome Carbide Plug Gages.
Standard Nominal Diameter Sets of Plug Gages.
Trilock Plug Gages.
Master Setting Disks.
Multipurpose Gear Wire Sets.

Available on Request

Kindly make your request for the NEW, REVISED Van Keuren Catalog and Handbook #36 on your own or your company's letterhead. Your request incurs no obligation.

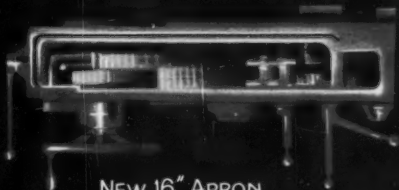
THE *Van Keuren* CO.,

178 WALTHAM STREET, WATERTOWN, MASS.

Optical Flats • Light Wave Equipment • Light Wave Micrometers • Gage Blocks • Wire Type, Taperlock and
Trilock Plug Gages • Master Setting Disks • Thread Measuring Wires • Gear Measuring Wires • Carbide
Plug Gages • Laps and Surface Plates • Precision Lapping Service.



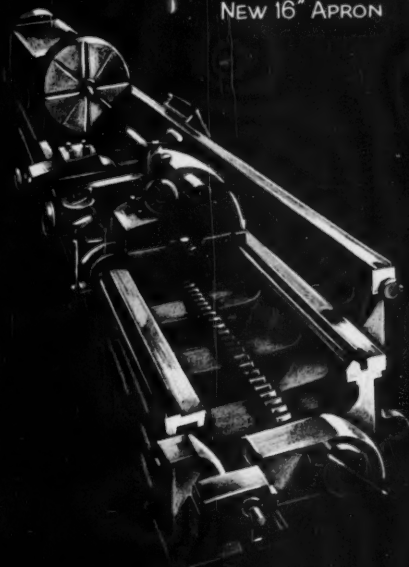
AT THE SHOW



NEW 16" APRON



NEW 15" DUAL DRIVE



50" ROLL TURNING LATHE



NEW 32" SPINDLE



NEW HEAVY DUTY BED



NEW HEAVY DUTY TAILSTOCK

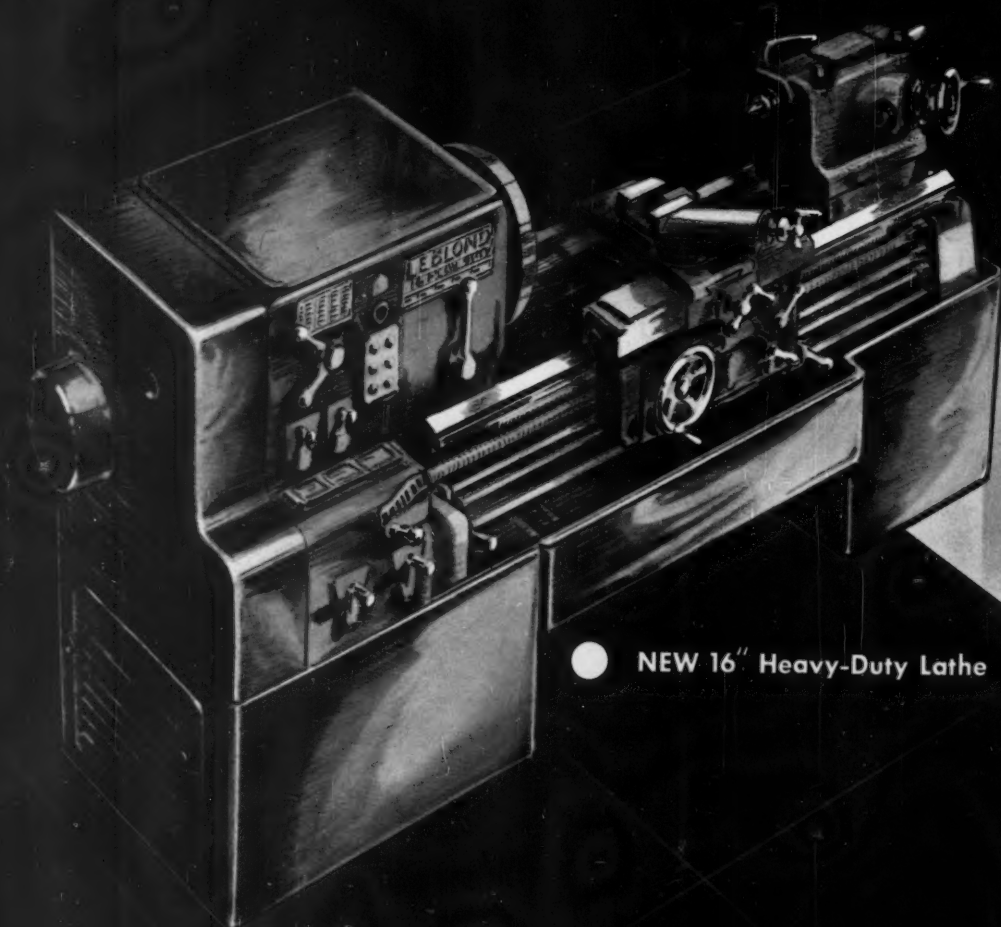


NEW 13" REGAL

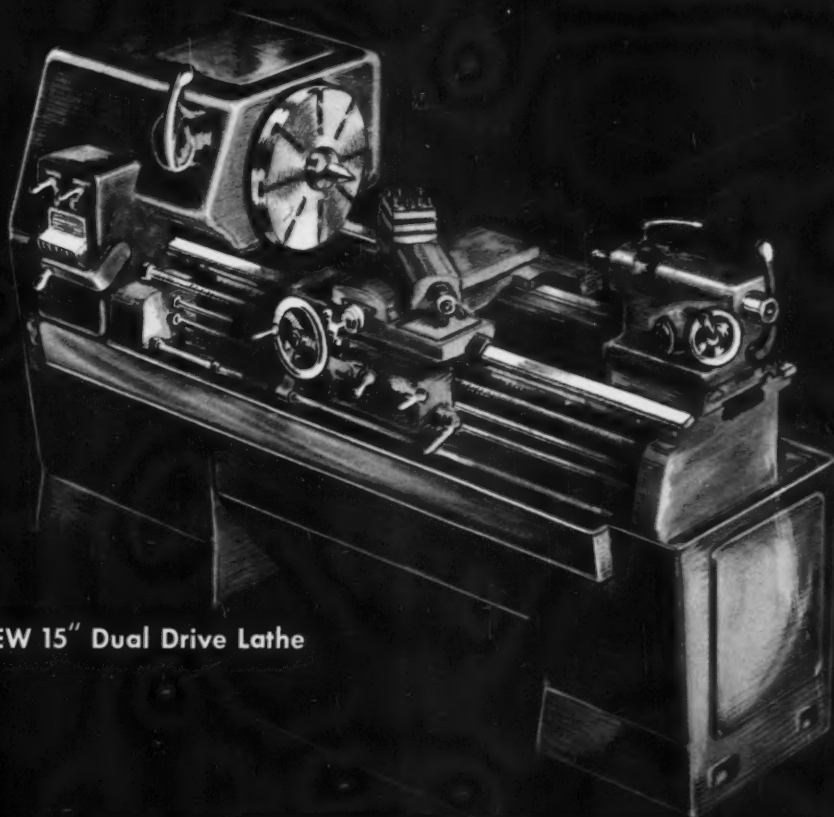
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NEW 15" Regal Lathe



NEW 16" Heavy-Duty Lathe



● **NEW 15" Dual Drive Lathe**

**CUT WITH CONFIDENCE...
WITH THESE**

NEW LeBLONDS

● **13", 15", 17" and 19" Regals**

Designed and built like heavy-duty lathes, the new LeBlond Regals offer a long life of precision production, minimum maintenance and true big-lathe dependability! New headstock uses proven gear-belt drive design. New bed has replaceable hardened and ground steel ways. Other big-lathe features—Separate feed rod and leadscrew. 3-bearing spindle. Automatically-lubricated quick-change box. Many more. Ask for Bulletin R-200S.

● **15" Dual Drive**

For medium-duty performance at low cost, the new LeBlond Dual Drive is number one! With a single lever you get 16 spindle speeds from 30 to 2400 rpm. The headstock is of combination gear-belt drive design with a 3-bearing spindle. Motor is 5 hp., 1800 rpm. Quick-change box is totally-enclosed. Replaceable hardened and ground steel ways are fitted to the compensating veeway principle for the best distribution of forces. Ask for Bulletin 6S.

● **16" Heavy Duty**

Completely redesigned from top to bottom, our new 16" is the most advanced heavy duty in the business! The combination gear-belt drive headstock provides 27 spindle speeds. The center spindle bearing is supported in the new Timken "semi-flexible mounting" for precise support throughout the speed range. Four-way power rapid traverse. 20 hp. Totally-enclosed quick-change box. Replaceable hardened and ground steel bed ways. Ask for Bulletin HD126S.



AT THE SHOW



We are extremely proud of the major design advancements you'll see at the LeBlond Exhibit—No. 1313, dead center in the new Exhibition Hall. You'll see 16 of the world's most modern lathes. You'll witness unique demonstrations in tracing, rapid boring and high-power turning. *Don't miss LeBlond!*



NEW 13", 15", 17" and 19" Regal Lathes

Famous for dependable performance at low cost, our Regals have been redesigned from the ground up! Big-lathe features include — Combined gear and belt-drive headstock. Replaceable hardened steel bedways. Separate feedrod and leadscrew.

NEW 15" Dual Drive Lathe

Best buy in the medium-duty class, the new Dual Drive features 16 speeds from 30 to 2400 rpm through a combined gear and belt-drive headstock. 5 hp. Replaceable hardened steel bedways. Totally-enclosed quick change box.

NEW 16" Heavy Duty Lathe

Most popular of the heavy duties, our new 16" provides 27 speeds from 16 to 2000 rpm through a combined gear and belt-drive headstock. 20 hp. Four way power rapid traverse. Replaceable hardened steel bedways. Enclosed quick change box.

RT Toolroom Lathe

Even today, other lathes can't match the advanced designs pioneered by LeBlond in the RT. Universal QC box—90 feeds and threads. Automatic chasing stop. Combined feed apron with built-in taper attachment.

NEW 25" and 32" Heavy-Duty Lathes

Cut with confidence at high horsepower! New headstocks use heavy, short shafts; 4-bearing spindle; provide adjustable accelerations for starting, stopping, jogging. 50 hp on the 25", 60 hp on the 32".

NEW 32" Special Heavy-Duty Lathe

You'll see well over 100 hp actually used at the tool. Built for Carbide tooling to test the newest in carbide tooling, this special 32" uses a 125 hp, variable speed drive, provides speeds from 42 to 1400 rpm.

NEW 25"/50" Sliding Bed Gap Lathe

A brand new model of this most versatile of lathe designs. Headstock provides 36 spindle speeds from 6 to 625 rpm. Adjustable acceleration for starting, stopping, jogging. New bed increases stability, easy cleanout.

50" Roll Turning Lathe

See how huge steel mill rolls are contoured in less than half former time. Two-directional hydraulic tracing from a simple template. Feed and speed can be varied during cut without leaving a tool mark.

NEW Automatic Crankshaft Lathe

Fifty-five crankshafts per hour are turned on the fastest crank-turning equipment yet developed. Five main bearings, flange and pilot, sprocket diameter and front end turned simultaneously. Transfer is automatic.

NEW LeBlond-Carlstedt Rapid Borer

Entirely new concept in high production of deep holes. Designed expressly to accommodate the new boring method and tooling developed in Europe. Don't miss this demonstration — see holes bored 3 to 8 times faster than ever before!

... cut with confidence

THE R. K. LEBLOND MACHINE TOOL COMPANY

CINCINNATI 8, OHIO



World's Largest Builder of a Complete Line of Lathes . . . For More than 68 Years

Turn the page for a preview

Litho in U.S.A.



Booth
1205

At your fingertips and at real savings - small drawn parts by Hydroforming

THE NEW CINCINNATI 8" HYDROFORM

brings decided time and cost savings to manufacturers required to produce small, deep drawn and formed parts. Illustrated above is a typical example.

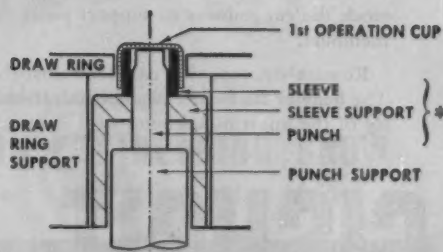
The photo shows, in sequence, the three Hydroforming operations to produce an electron tube component. Material is 0.020" O. F. H. C. copper. This part would have required five or six operations by conventional methods.

To illustrate the simplicity of Hydroform tooling, the diagram below, right, shows the redraw tools used in the second operation. The sleeve, sleeve support and punch were made of ordinary steel, turned on a lathe. The 1½" dia. x 1¼" deep 1st operation cup was simply placed on the sleeve and redrawn. Redraw tools for the final operation were similar and equally inexpensive.

Parts from sheet materials up to ¼" steel, from blanks up to 8" in diameter, can be drawn on the 8" Hydroform. Maximum draw depth is 5". For larger work, Hydroform machines of 12", 19", 23", 26" and 32" capacities are available. Let a Cincinnati Milling field engineer give you detailed information on how you can profitably apply Hydroforming to your work. For a description of the process and specifications of the six machine sizes, write for Bulletin M-1759-3.



Cincinnati 8" Hydroform



* 2nd Operation Redraw Tools



Hydroform

PROCESS MACHINERY DIVISION

THE CINCINNATI MILLING MACHINE CO.

CINCINNATI 9, OHIO, U. S. A.

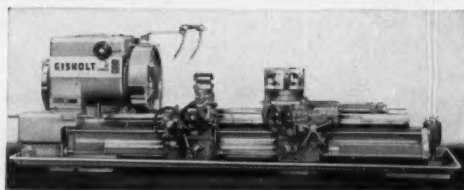


**"Here's why GISHOLT insists upon
the **HEAVIEST CASTINGS!**"**

Look at them . . . castings for the heaviest saddle type turret lathes in the business! Look at all the angles:

First, note how the headstock is cast integrally with the bed for perfect spindle alignment . . . how cross supports give the most solid base for carriages, tools and slides . . . how extra-heavy webbing gives the headstock the ruggedness to support powerful gear train members.

Remember, too, that cast iron absorbs vibration. The heavier the better! And Gisholt controls the quality of the finest nickel semi-steel in its own foundry.



The Gisholt 5L Saddle Type Turret Lathe has a net weight of 22,500 lb. without equipment.

What does it mean to you? You can load up your Gisholts with carbides and really turn out the chips! You've got the strength, the rigidity and the freedom from vibration to take all the speed you can get from today's carbides—with the heaviest feeds—and still have the safety margin to take care of tomorrow's tool bit developments.

GISHOLT
MACHINE COMPANY
Madison 10, Wisconsin

THE GISHOLT ROUND TABLE
represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.



TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES

M-R-C

SUPER-PRECISION BEARINGS



M-R-C has long been known for leadership in the field of Super-Precision Ball and Roller Bearings.

Our new Super-Precision plant in Falconer, N. Y. is now in full production — including small sizes of instrument bearings.



See our display at BOOTH 536

THE PRODUCTION ENGINEERING SHOW

Navy Pier, Chicago September 6-16, 1955

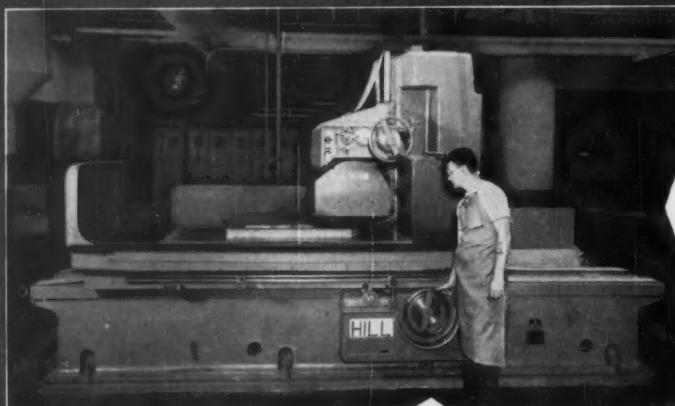
MARLIN-ROCKWELL CORPORATION

Factories: Jamestown, N. Y., Falconer, N. Y., Plainville, Conn.

Executive Offices: Jamestown, N. Y.

What HILL GRINDERS Have Done for Others They Will Do for YOU!

- Produce a smoother finish and closer tolerances.
- Increases man-hour production.
- Actual case histories prove definite worthwhile dollar savings over other methods



Use the "Hill" Horizontal Spindle Grinder for a wide range of grinding — flats, angles, irregular and special shaped surfaces — ideal for maintaining close tolerances with low micro inch finish. Made in table widths of 18", 24", 30" and 36" — table lengths from 5 to 20 feet.

- Built in both Horizontal Spindle and Vertical Spindle types.
- Choose the most efficient type for YOUR requirements.

Use the "Hill" Vertical Spindle Grinder for rapid stock removal and accurate grinding of flat surfaces — recommended for accuracy, speed and finish — features that mean increased precision production. Made in table widths of 18", 24" and 30" — table lengths from 5 to 20 feet.



THE HILL ACME COMPANY

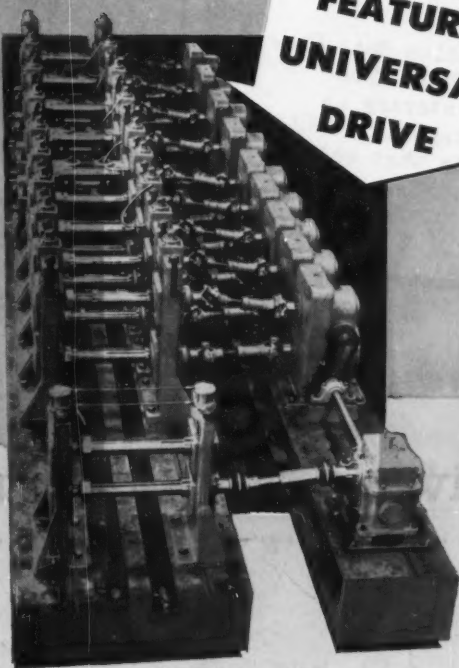
1209 WEST 65th STREET • • • CLEVELAND 2, OHIO

"HILL" GRINDING & POLISHING MACHINES • HYDRAULIC SURFACE GRINDERS • ALSO MANUFACTURERS OF "ACME" FORGING • THREADING TAPPING MACHINES • "CANTON" ALLIGATOR SHEARS • BILLET SHEARS • PORTABLE FLOOR CRANES • "CLEVELAND" KNIVES • SHEAR BLADES

LEADING THE INDUSTRY IN DESIGN . . .

Etna TUBE MILLS

FEATURE
UNIVERSAL
DRIVE



Etna Universal Drive

You'll notice a trend toward Etna's modern machine design. Etna has sold more Universal Drive Mills than all other manufacturers combined. The Universal Drive provides greater accuracy in the forming of the tube, and allows an easier change from the manufacture of one diameter tube to another.



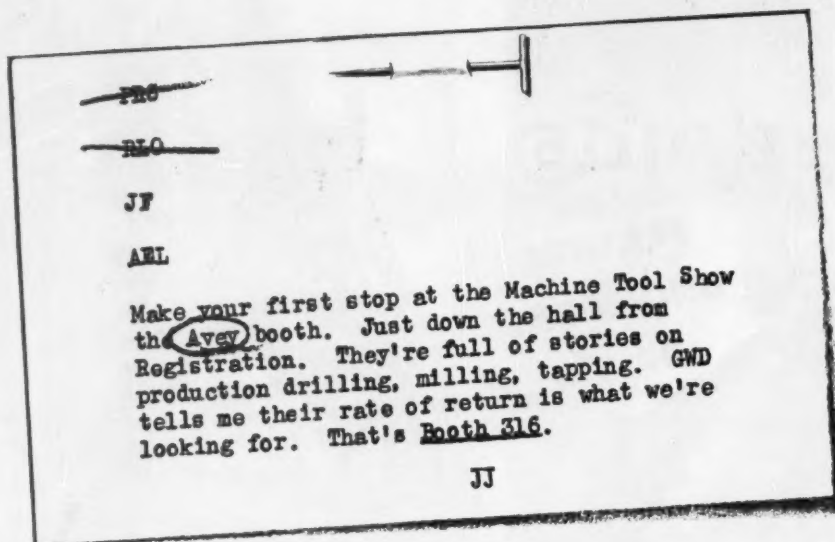
PERMANENT OIL COOLED TRANSFORMER

For greater efficiency an *Oil Cooled Transformer* is incorporated into the machine. It is a *permanent unit* and *never has to be replaced*. Cooling with oil eliminates the necessity to dry out the transformer after each days work, which is necessary when water is used as a transformer coolant. Etna Mills . . . Built for continuous operation. Write for complete details.

Abbey **ETNA** Company
3422 MAPLEWOOD AVE., TOLEDO 10, OHIO

For more information on products advertised, use Inquiry Card, page 325

MACHINERY, September, 1955—75



you can drive to the poorhouse

This is not intended as a joke: the machine tool that was *paid for* long since may today produce an annual loss equal to its cost of replacement. We know, because Avey equipment has helped many companies to stop losing money on antiques, and make money so fast that the investment was paid for in a year or year and a half. Why?

Because Avey production drilling machines are essentially simple, compact, straightforward in design, built in standard units that fit together to fit your job, and function with standard work-holding fixtures. When a production run is finished, the units are often rearranged for another job, at a fraction of the cost of the original setup, and the owner gets an even bigger bonus of earnings.

Are you really convinced that your drilling operations are now running at top efficiency? Send us your part prints and if we can't be convinced, too, *you stand to gain.* ◀

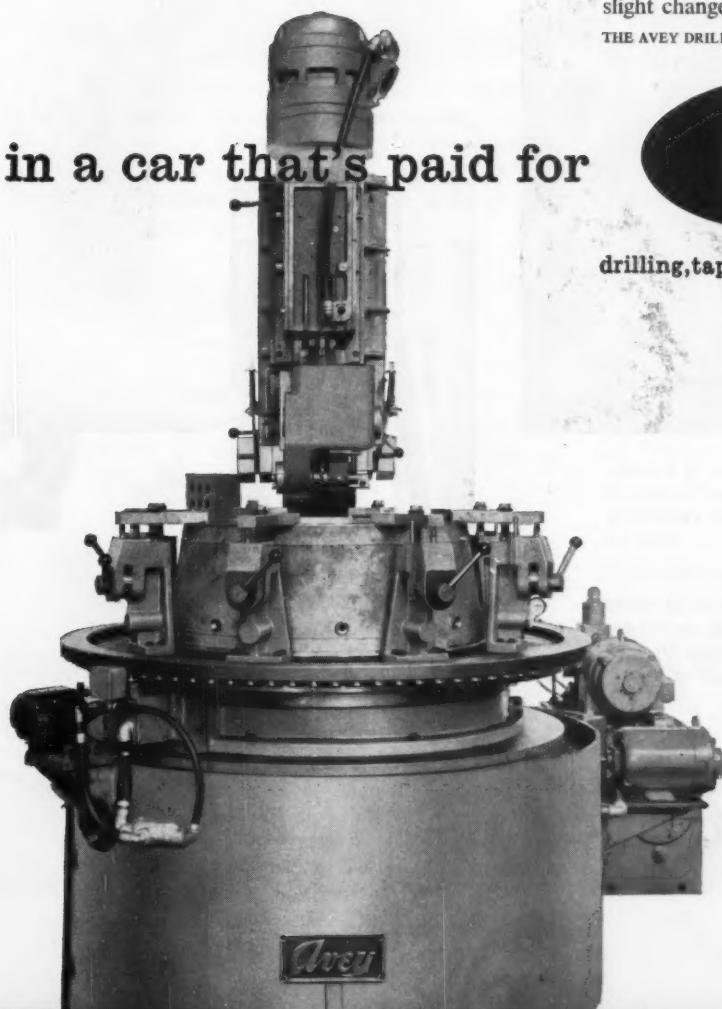
This Avey machine mills 88 slots in a stainless steel jet engine part—a slot every 40 seconds. Vertically mounted automatic cam feed unit produces desired cycle time. Cutter head can't operate unless automatic indexing table is in correct position. Our advanced Electrodex table makes it easy to change fixture and part quickly with only slight change in indexing mechanism.

THE AVEY DRILLING MACHINE CO., CINCINNATI 1, OHIO

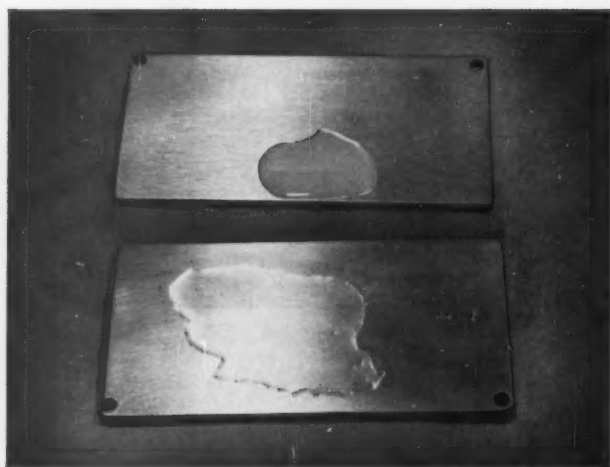
...in a car that's paid for



drilling, tapping, production machines

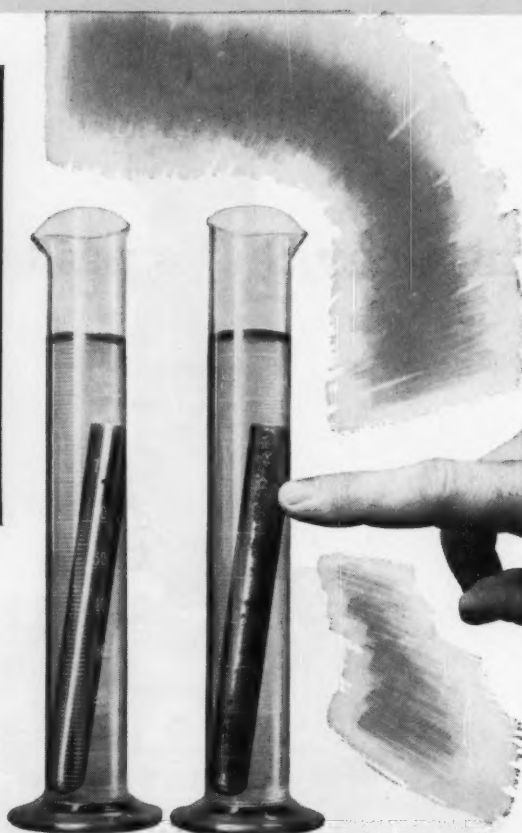


Announcing **SHELL DROMUS OIL E**



Above: Cooling action of a cutting fluid is directly related to its wetting ability. Conventional soluble oil emulsion (background) "balls" up. Equal amount of Shell Dromus Oil E spreads out thinly . . . wets far greater area.

Right: Plain carbon steel, if left in water at room temperature for about two hours, will rust as shown. Sample on left was in a 1-30 solution of Shell Dromus Oil E and water for six months without rusting.



SHELL DROMUS OIL E

NEW CUTTING OIL

*permits higher speeds
and faster feeds
than ever maintained before*

Shell Dromus Oil E, a new solution-type fluid, wets all metal surfaces with extreme rapidity and keeps both work and tools exceptionally cool. These qualities permit an increase of machine speeds and/or feeds far beyond anything allowable with conventional soluble oils.

IT'S MUCH EASIER ON TOOLS

There's much more life in any cutter or abrasive wheel when protected by this new oil. *It stays put* between tool and work. (At a 1-30 dilution, average tool life increase in extended field tests was about 50%.)

IT FIGHTS RUST

Shell Dromus Oil E is readily soluble in hot, cold, soft or hard water, and stable in any concentration. Even at low concentrations, it gives excellent rust protection to all ferrous metals, *including cast iron*.

IT KEEPS WORK COOL

Even at stepped-up production rates, you'll find less heating and better finish wherever this new oil is used.

IT SETTLES OUT FAST

Chips and wheel particles settle out immediately . . . the recirculated fluid is clean and free from contaminating particles. It is *not* sticky or greasy . . . leaves no deposits on machines or work.

IT'S GREAT FOR GRINDING

Grinding wheels remain clean, *even when material retains a film of cutting oil from a previous operation*. Even cast iron can be ground cleanly when Shell Dromus Oil E is used to cool the work.

If all this reads "too good to be true," we suggest that you try Shell Dromus Oil E *on any problem operation you have*. It is that good!

SHELL OIL COMPANY

50 West 50th Street, New York 20, New York
100 Bush Street, San Francisco 6, California



**SNYDER SEGMENTED
AUTOMATION** in 91 station,
182 operation, in-line transfer machine
features four segments which can
operate independently or as a unit to
assure continuous production of auto-
motive automatic transmission cases at
100 cases an hour at 80% efficiency

BOOTH 1222

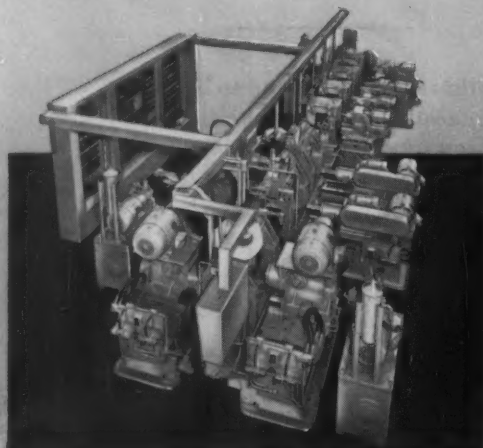


SNYDER

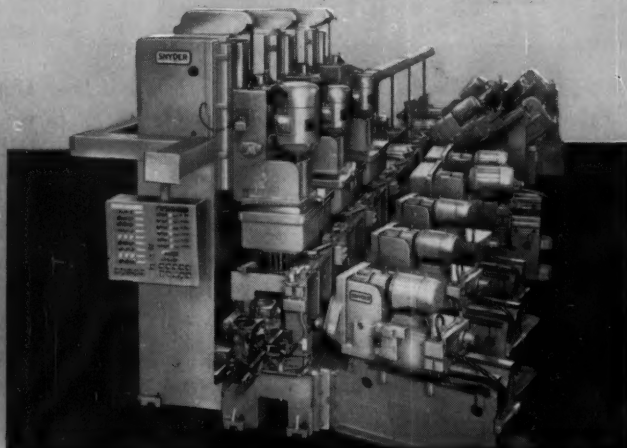
TOOL & ENGINEERING COMPANY
3400 E. LAFAYETTE, DETROIT 7, MICHIGAN

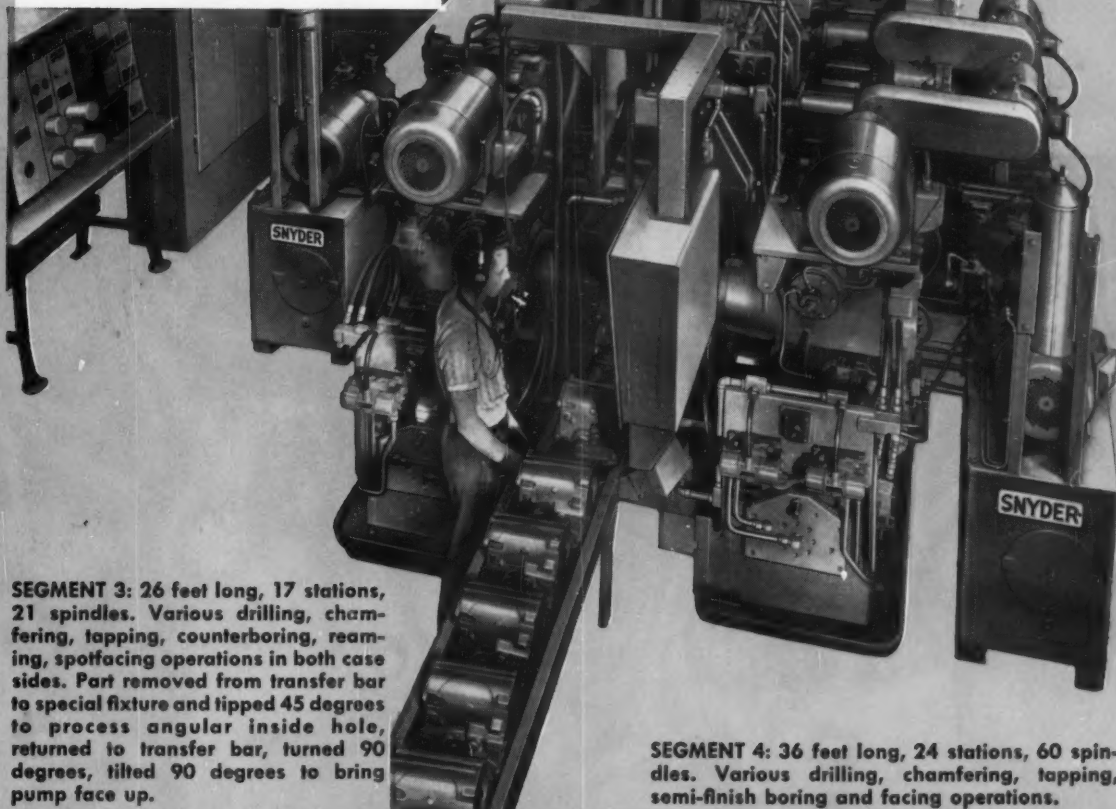
30 Years of Successful Cooperation with Leading American Industries

SEGMENT 1: 40 feet long, 19 stations, 10 spindles. Part manually loaded, both ends face milled, counterbored, three diameters rough and finish bored and faced, two pads side milled, pump pad face milled, clearance slot milled. Part tilted 90 degrees in processing.



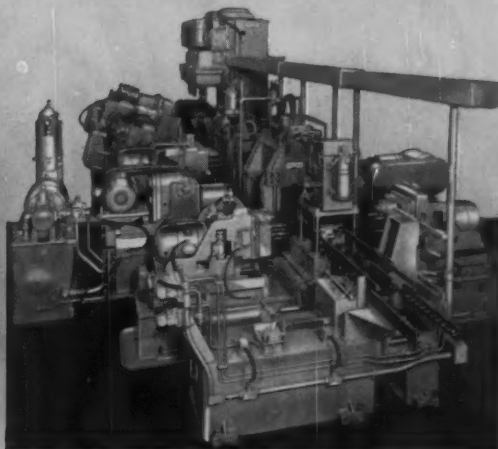
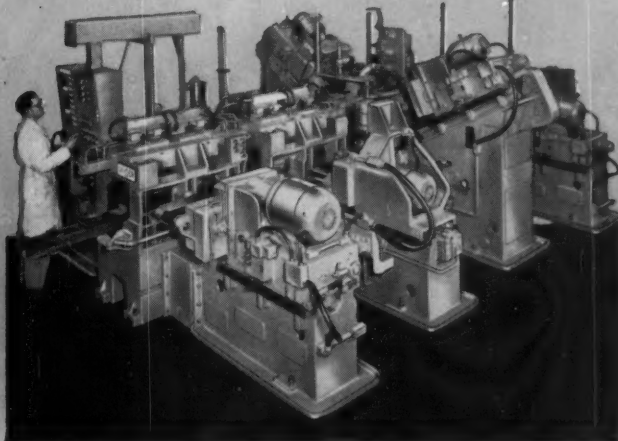
SEGMENT 2: 47 feet long, 31 stations, 91 spindles. In top face, end and at angular locations inside, 51 holes are drilled, countersunk, semi-finish and finish reamed, spot-faced, tapped. Part is tilted 90 degrees and rotated.





SEGMENT 3: 26 feet long, 17 stations, 21 spindles. Various drilling, chamfering, tapping, counterboring, reaming, spotfacing operations in both case sides. Part removed from transfer bar to special fixture and tipped 45 degrees to process angular inside hole, returned to transfer bar, turned 90 degrees, tilted 90 degrees to bring pump face up.

SEGMENT 4: 36 feet long, 24 stations, 60 spindles. Various drilling, chamfering, tapping, semi-finish boring and facing operations.



Tools – and operators – keep their tempers with Norton wheels

*Only Norton builds these value-adding, time-saving
"TOUCH of GOLD" features into wheels for tool room grinding*



All teeth stay the same height when you sharpen milling cutters with long wearing, free cutting Norton G Bond wheels that hold size all the way round. 32 ALUNDUM* abrasive permits top grinding speed without burning. The machine is a Norton No. 20 Cutter and Tool Grinder.

No other wheels for tool room grinding are made the way Norton makes them. Exclusive precision processing gives them unusual advantages, including controlled uniformity and built-in balance, that reduce vibration and assure smoother running wheels.

Plus The Famous G Bond

Also, you can get these wheels in the most efficient vitrified bond ever produced — the Norton G Bond, developed especially for precision-grinding the hardest tool steels. Holding the abrasive particles just long enough for maximum cutting action, G Bond wheels: *cut freer, cooler, faster . . . do more work per wheel and cover a wider range of jobs . . . hold corners better, dress easier and grind more pieces per dressing.*

And for rapid stock removal, with especially cool cutting action, Norton 32 ALUNDUM* abrasive is outstandingly popular. With all G Bond wheels you can take heavier cuts in expensive, heat-sensitive steels without drawing temper. They'll reduce tool spoilage, give you closer tolerances and smoother finishes, with fewer wheel changes and machine adjustments — additional "Touch of Gold" benefits that mean better performing tools and better, lower-cost tool room grinding than you ever got before.

For Your Carbide Grinding

Norton diamond wheels, carbide grinding's recognized "Crown Jewels", are products of Norton's long leadership in diamond wheel development. Made in all required bond types, their accurate cutting action and extra long service life bring you top savings in every single-point and multi-tooth carbide grinding application. Also available are CRYSTOLON* wheels — green and gray — with the cost-cutting K Bond.

Your Norton Distributor

will gladly recommend the right Norton wheels for your tool room requirements. Or write direct. And remember: only Norton brings you such long experience in both grinding wheels and grinding machines — your assurance of the "Touch of Gold" that helps you produce more at lower cost. NORTON COMPANY, Worcester 6, Mass. Distributors in all industrial areas, listed under "Grinding Wheels" in your phone book, yellow pages. *Export:* Norton Behr-Manning Overseas Incorporated, Worcester 6, Mass.

*Trade-Marks Reg. U. S. Pat. Off. and Foreign Countries



Offhand grinding a planer tool is a fast, cool operation with Norton G Bond wheels. ALUNDUM* abrasive permits top grinding speed without burning.

For the latest information
on grinding visit us at

SPACE 516

MACHINE TOOL SHOW

International Ampitheatre, Chicago

Norton abrasive engineers and
grinding machine engineers will
be available to help you solve
your grinding and finishing problems

W-1660



*Making better products...
to make your products better*

and its BEHR-MANNING division

NORTON COMPANY: Abrasives • Grinding Wheels • Grinding Machines • Refractories
BEHR-MANNING DIVISION: Coated Abrasives • Sharpening Stones • Pressure Sensitive Tapes

MORE TRANSMISSION CASES AT LESS COST.....

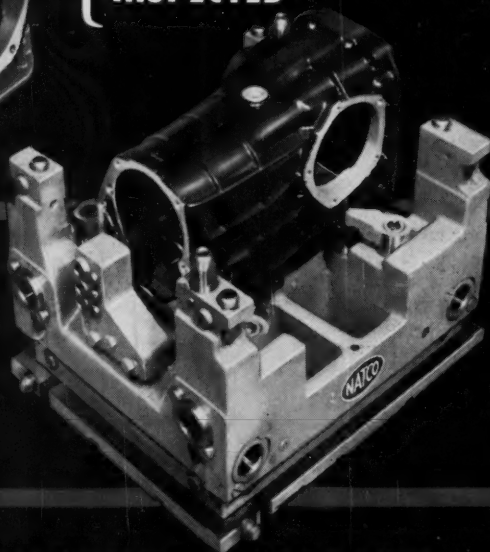
55 PARTS per HOUR

**201 OPERATIONS
ON EACH PART**

**DRILLED, BORED,
REAMED, TAPPED,
SPOTFACED, CROSS-
FACED, MILLED,
CHAMFERED and
INSPECTED**



Parts are loaded into individual holding units which are conveyed through the machine automatically. After machining is completed, chips are removed and the holding units pass through a washer and are returned to the first station.



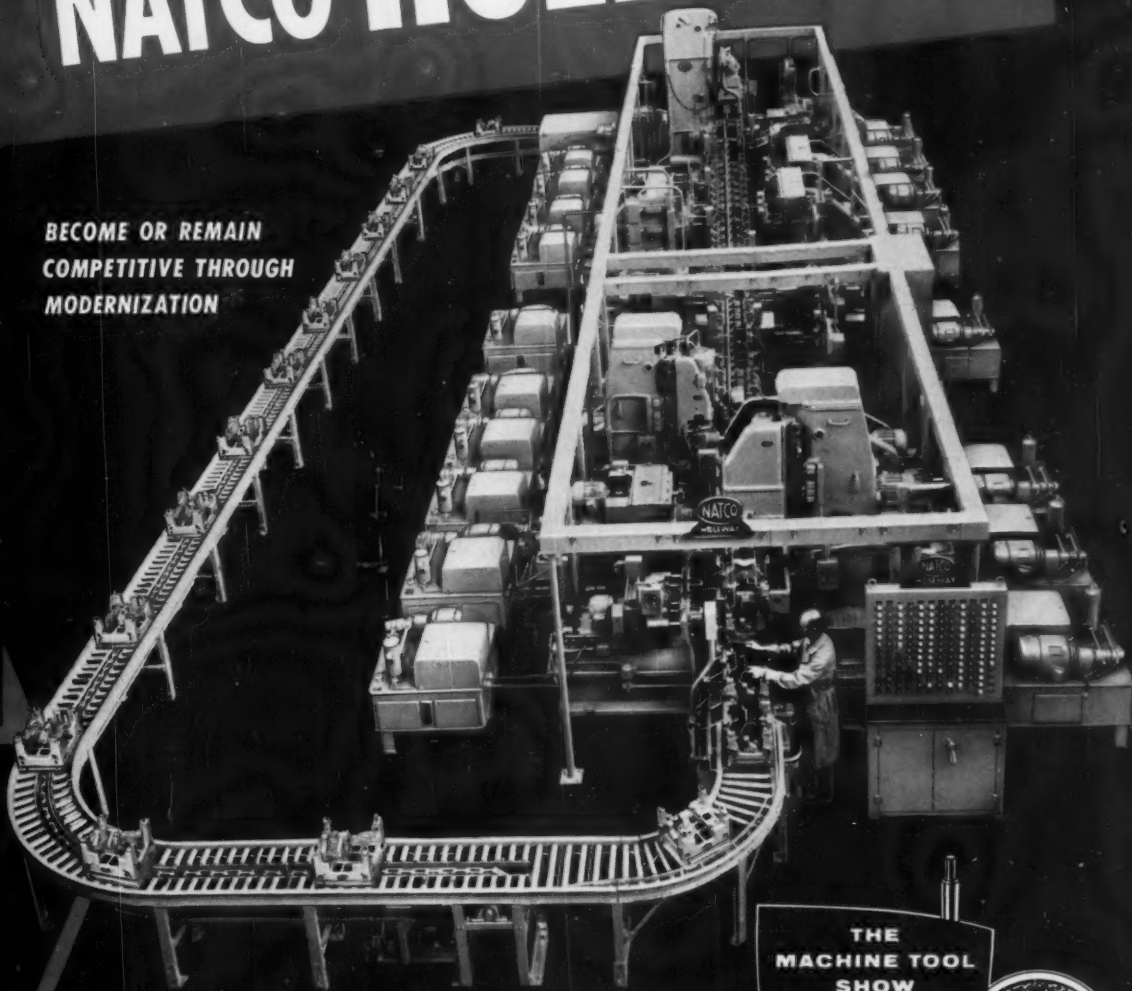
for answers to your Drilling, Boring, Facing and Tapping problems

Call a Natco Field Engineer

CHICAGO, Room 203, 6429 W. North Ave., Oak Park
DETROIT, 10138 W. McNichols Rd.
BUFFALO, 1807 Elmwood Ave.
NEW YORK, 35 Beechwood Ave., Mount Vernon

WITH A NEW NATCO HOLEWAY

BECOME OR REMAIN
COMPETITIVE THROUGH
MODERNIZATION



...*Competitize* with NATCO production!

NATIONAL AUTOMATIC TOOL COMPANY, INC.

RICHMOND, INDIANA

THE
MACHINE TOOL
SHOW

CHICAGO, ILL.
SEPT. 6-17, 1955

INTERNATIONAL AMPHITHEATRE



NATCO



DIAL INDICATORS

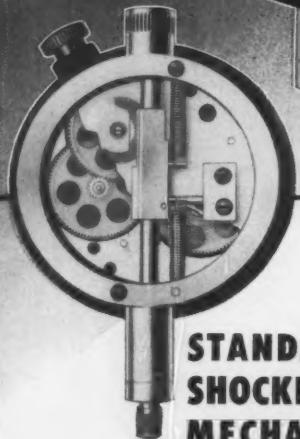
100% SHOCKPROOF



REGULAR
DIAL MARKINGS



DECIMATIC
DIAL MARKINGS



STANDARD'S SHOCKPROOF MECHANISM

Not initial accuracy alone, but accuracy maintained under actual operating conditions, is the practical, decisive measure of performance in dial indicators. STANDARD was first to make this an actuality by introducing its truly 100% shockproof mechanism.

Because sudden impacts and blows are completely absorbed and dissipated before they can reach the gear train, STANDARD Dial Indicators preserve their initial precision despite rough handling.

AVAILABLE in a wide variety of sizes, models and graduations, all in complete accord with AGD specifications.

Decimatic series — meeting AGD specifications except for range and dial marking, which is in decimal or metric system. Especially well suited for close tolerance inspection of large lots. Bright red, whip-free hands facilitate rapid reading; modified range eliminates chance of overlooking a complete revolution, which can happen with other types. Can be mounted in fixtures designed for AGD mounting dimensions.

All the above furnished fully jeweled as optional extra.

Special Decimatic series (extra-special accuracy) — where particularly fine checking is required, these indicators can be furnished, at extra cost, with especially fine accuracy over the entire range (from approximately 20 minutes of to 20 minutes past). Furnished fully jeweled only.

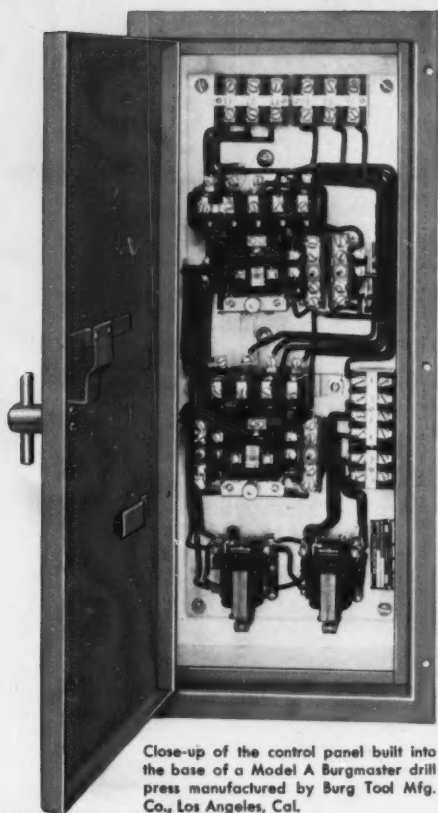
STANDARDIZE on STANDARD

WRITE FOR COMPLETE INFORMATION

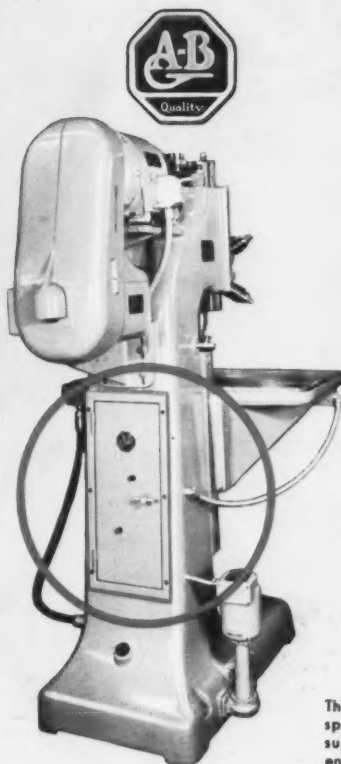
STANDARD GAGE COMPANY, INC.

42 PARKER AVENUE

POUGHKEEPSIE, N. Y.



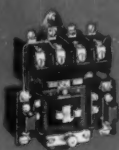
Close-up of the control panel built into the base of a Model A Burgmaster drill press manufactured by Burg Tool Mfg. Co., Los Angeles, Cal.



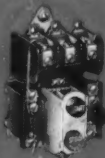
The Allen-Bradley special control is supplied with an enclosure designed to fit into the machine frame.

The ALLEN-BRADLEY "QUALITY" TRADEMARK IS A BIG SALES ASSET TO YOUR MOTORIZED MACHINES

QUALITY COMPONENTS for A-B Control Panels



Size 1
Automatic Starter



Size 1
Manual Starter



Bulletin 849
Pneumatic Timer



Bulletin 700 Uni-
versal 4-pole Relay

Wherever possible, control apparatus ought to be built into the machine frame. The modern, streamlined appearance will appeal to your customers.

See how neatly the Burg Tool Mfg. Co. has integrated the compact Allen-Bradley control panel into their machine pedestal. The panel is assembled from Allen-Bradley standard, catalog listed items known to be good for millions of trouble free operations.

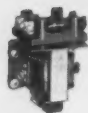
Let us help you add a real sales asset to your machines!

Allen-Bradley Co.
1316 S. Second St.
Milwaukee 4, Wis.

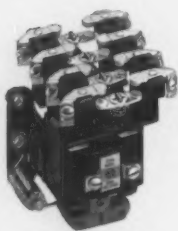
In Canada—
Allen-Bradley Canada Ltd.
Galt, Ont.

7-55-R

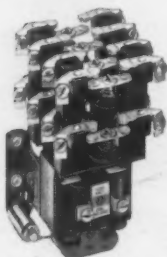
ALLEN-BRADLEY
QUALITY
MOTOR CONTROL



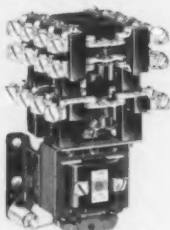
Type C-200 A-C
2-pole relay



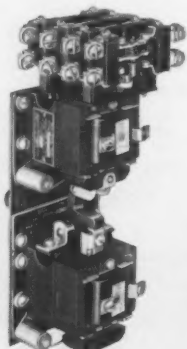
Type B-400 normally
open 4-pole relay



Type B-800 normally
open 8-pole relay



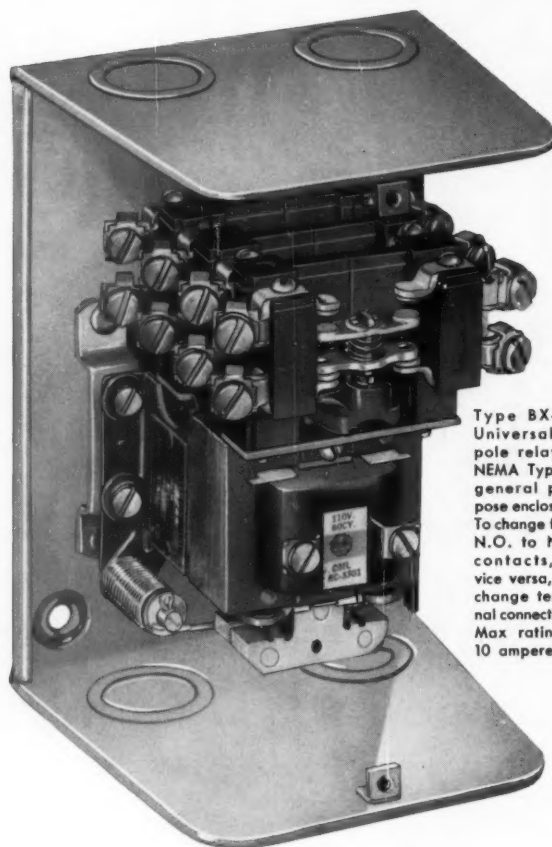
Type BX-840 universal
8-pole relay



Type BXL-440 uni-
versal relay with latch

QUALITY RELAYS

**for Long, Trouble Free Service
in Critical Control Circuits**



Type BX-44
Universal 4-
pole relay in
NEMA Type 1
general pur-
pose enclosure.
To change from
N.O. to N.C.
contacts, or
vice versa, just
change termi-
nal connections.
Max. rating—
10 amperes.

Here is a line of small relays that is ruggedly built for tough industrial service. The simple solenoid design...with **ONLY ONE MOVING PART**...guarantees millions of failure free switching operations. The double break, silver alloy contacts need no cleaning, filing, or other maintenance. For complete Allen-Bradley relay data, please write for Bulletin 700.

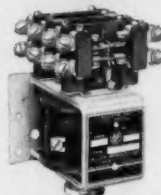
Allen-Bradley Co.
1316 S. Second St., Milwaukee 4, Wis.

In Canada—
Allen-Bradley Canada Ltd., Galt, Ont.

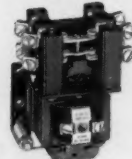
ALLEN-BRADLEY

BULLETIN 700 RELAYS

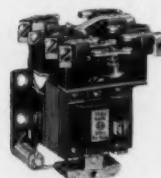
QUALITY



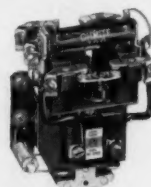
Type EX-440 D-C uni-
versal relay



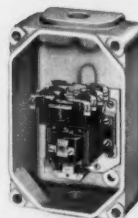
Type BX-220 universal
2-pole relay



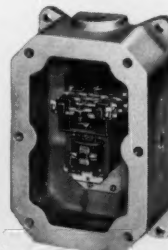
Type BM-200 mechan-
ically held relay



Type BA-20 2-pole
thermostat relay



Relay in watertight
enclosure



Relay in explosion-
proof enclosure

7-55-MR

An Invitation to

THE WORLD'S BEST INVESTMENT IN ACTION



from the Rockford Insert Group including:

Barnes Drill Co.

Barber-Colman Company

Hendey Machine Division

Barber-Colman Company

Greenlee Bros. & Co.

John S. Barnes Corporation

Mattison Machine Works

Rehnberg-Jacobson Mfg. Co.

Rockford Machine Tool Co.

Sundstrand Machine Tool Co.

American Broach & Machine Company

DIVISION OF

Sundstrand Machine Tool Co.

W. F. & John Barnes Co.

A. An Ingersoll 7" Bar Traveling Housing Milling and Boring Machine for rolling mill parts.

B. A Special Design Ingersoll Traveling Head Milling Machine for machining large tractor parts.

C. An Ingersoll Special Design Adjustable Rail Milling Machine fixtured to machine refrigerator compressor parts.

D. An Ingersoll 9-Station Process Machine for machining a new V-8 engine at the rate of 65 per hour.

INGE



Machinery, September, 1955

MACHINES DESIGNED TO MEET YOUR NEEDS **ROCKFORD, ILLINOIS, U. S. A.**

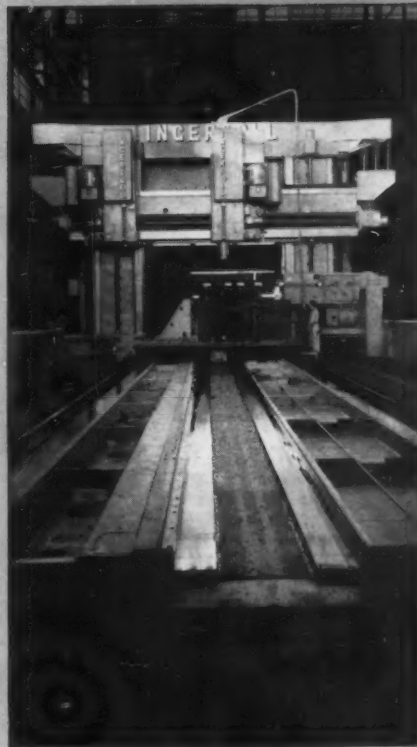
Invitation to visit **INGERSOLL**

No Ingersoll machines will be displayed at the Machine Tool Show in September. During September, however, we will be testing eight large machines on our assembly floors—including four adjustable rail milling machines ranging in horsepower from 30 to 100. Our customers will use them for machining refrigeration compressor parts, automobile body dies, and machine tool frames.

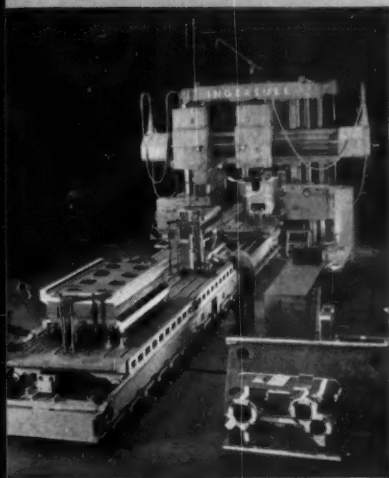
We will also be testing a 9-station process machine for the first operations on an automobile cylinder block; a special single station machine for tractor frames; a special vertical spindle milling machine for small die work; and a large 7" bar traveling housing milling and boring machine for machining rolling mill parts.

The sketches at the left represent four of these new machines. If you would like to see any particular one, our representative will be glad to assist you in getting to Rockford when it is running.

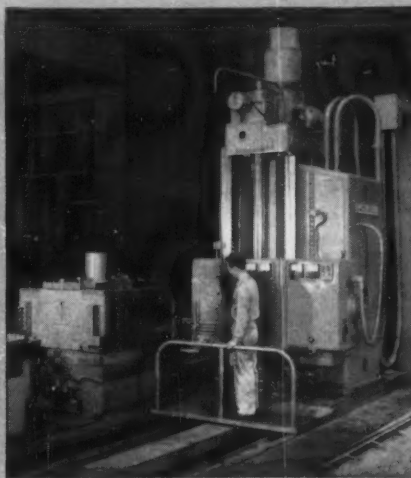
Our own machine shop will be working day and night during September on parts for machines we will ship during November and December. The photos at the right show four recent additions to our heavy milling department. We would like to have you see these machines under production conditions.



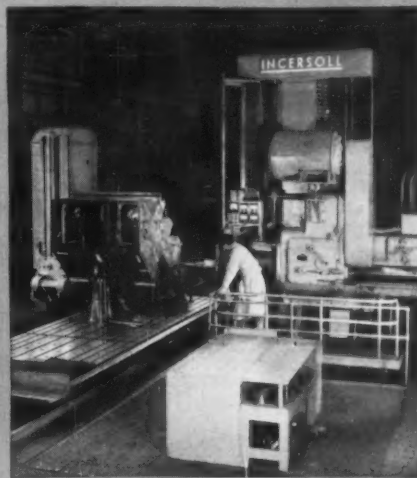
A 1,150,000 pound Ingersoll Adjustable Rail Milling Machine with 850 total connected horsepower—the largest milling machine in the world.



The latest design Ingersoll Adjustable Rail Milling Machine for medium size work—capable of delivering 100 H.P. to any spindle.



An Ingersoll Special Design Horizontal Spindle Milling Machine with two indexing work tables—one equipped with magnetic fixtures.



An Ingersoll 8" Bar Openside Machine specially designed for heavy milling and accurate boring on our own machine parts.

RSOLL

INGERSOLL MILLING MACHINE COMPANY ROCKFORD, ILL.

Machinery, September, 1935

FOR PRODUCTION MACHINE TOOLS IT'S **ROCKFORD, ILLINOIS, U. S. A.**



SPECIAL MULTI-OPERATION MACHINE TOOLS
NEEDLE BEARING ASSEMBLY MACHINES • INDEX TABLES
SELF-CONTAINED DRILL UNITS • SELF-CONTAINED TAP UNITS



When you are in ROCKFORD
be sure to visit this plant...

We would like to have you stop in and see us. We would like to have you meet the people who conceive, design, engineer, and manufacture REHNBERG-JACOBSON Special Machines and other products. We would like you to see the up-to-date facilities that are at our command to accomplish your purposes. The REHNBERG-JACOBSON plant is an interesting one because it does not follow the conventional pattern — just as REHNBERG-JACOBSON products are often outstanding in performance because they

employ ingenious new conceptions and new arrangements. You are welcome to visit any part of the REHNBERG-JACOBSON shop or offices that may interest you, and to talk with any of our people. One of our sales personnel or executives will be glad to guide you around. As a user of machine tools and allied products, you might like to know what facilities REHNBERG-JACOBSON has for satisfying your needs — and we want you to feel free to stop in and visit us the next time you are in ROCKFORD.



REHNBERG - JACOBSON
MANUFACTURING COMPANY
Designers and Builders of Special Machinery
2135 KISHWAUKEE ST., ROCKFORD, ILL.



Machinery, September, 1955

CENTER OF MACHINE-TOOL EXCELLENCE

ROCKFORD, ILLINOIS, U.S.A.

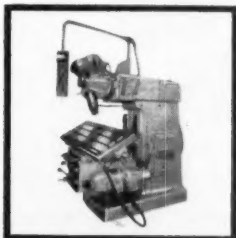
5-VA VERTIMIL

**A GREAT
MACHINE
MADE EVEN
GREATER**

by **EKSTROM, CARLSON**

Electronic INFINITELY-VARIABLE FEEDS INCREASE VERSATILITY TREMENDOUSLY

Here is a really *outstanding* Vertical-Spindle Milling Machine — for toolroom, job shop, and production use. Newest improvements include electronic controls that give continuously-variable feed ranges of .250" to 100" per minute on longitudinal and cross travel of the table, and from .070" to 38" per minute on vertical travel of the knee; both in two simple stages. A new pendant, convenient to the operator, carries all the control buttons, and the feed-setting arrangements and indicator. New gear-control levers on the knee improve the convenience and efficiency of set-up and operation. All in all, this great machine is *hard to beat* by the most up-to-date of modern standards. Let us tell you more about it... *write for full information.*



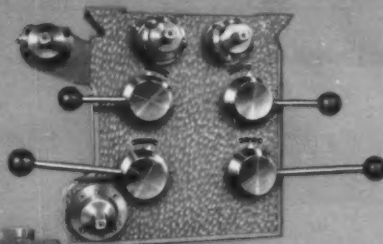
Left, picture shows extreme positions. Table tilts 30° either forward or back, spindle swings 45° to either side.



EKSTROM, CARLSON & CO.

1400 RAILROAD AVE., DEPT. M-4, ROCKFORD, ILLINOIS

Manufacturers of Machinery and Tools Since 1904



Above, manual and power table and knee directional controls are now all concentrated on the front of the knee to save the operator a lot of reaching around.



Left, the control pendant has a feed-rate indicating meter at the top, a master stop stick at the bottom, and all vital operating control buttons and selection switches on the panel.

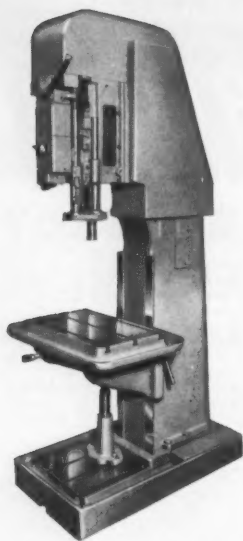
**12 SPINDLE SPEED RANGES
FROM 72 TO 2480 RPM**

Machinery, September, 1953

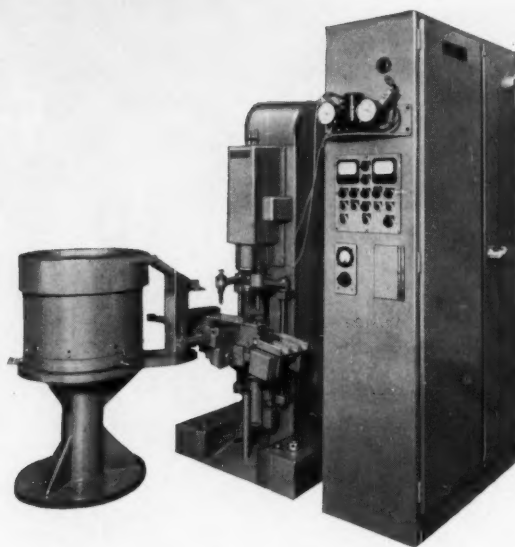
FOR PRODUCTION MACHINE TOOLS IT'S

ROCKFORD, ILLINOIS, U.S.A.



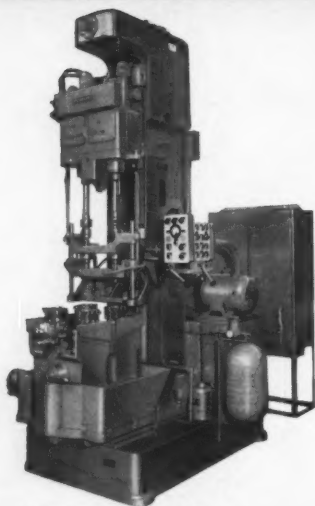


NEW 1½ HP Model S-64 Drilling Machine
Single Purpose, High Production, Hydraulic Feed
1500 lbs. Thrust, ¾" Capacity In Steel.

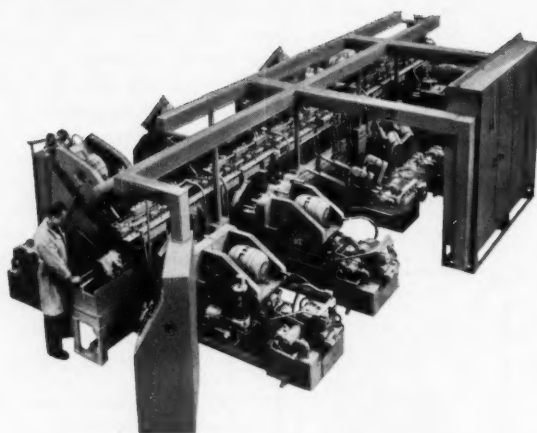


NEW Model 111 Honing Machine
For Automatic High Production Honing
of Small Size Bores.
Automatic Hopper-Feed and Unload
Plugmatic Sizing, Air-Electric Hone Expansion
Automatic Gaging for Selection of Parts To Be
Honed — rejection of parts unsuited
¾" Bore Capacity x 3" Maximum Length
2" Mechanical Stroke, 6" Lift-Out

see these **BARNESDRIL** *machines in action!*



No. 224 Honing Machine
Production Honing Cylinder Blocks
Plugmatic Sizing Electronic Hone Expansion
Sizing within .0005", 20-30 RMS Finish
Removing .002"/.003" Stock
Production Rate 240 Per Hour At 80% Efficiency

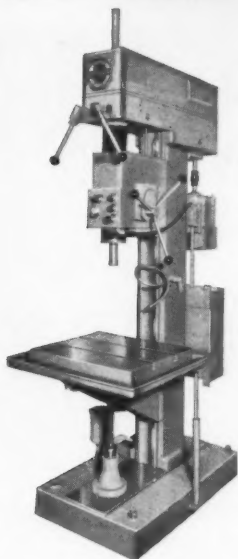


Special Unit of 19-Station Transfer Machine
One of 18 Units for Drilling, Milling, Reaming
and Tapping Automatic Transmission Cases
will be in Operation to Demonstrate Production
Rate of 75 Per Hour at 70% Efficiency.



Machinery, September, 1955

MACHINES DESIGNED TO MEET YOUR NEEDS ROCKFORD, ILLINOIS, U.S.A.



NEW 7/8" High Speed Drilling Machine
 7/8" Capacity In Steel
 Push Button Feed Engagement
 Depth Control with Automatic Feed Trip-Out
 Electric Starting Control
 Direct Reading Dial for Selecting Depth

Booth no. 818



If you're looking for new ideas, new ways to cut production costs, come to Chicago, September 6-17. Bring your key production people with you. See these machines in operation at our Booth No. 818. Complete information and literature available through our Sales Engineers and Personnel who will be on hand to demonstrate equipment throughout the show.

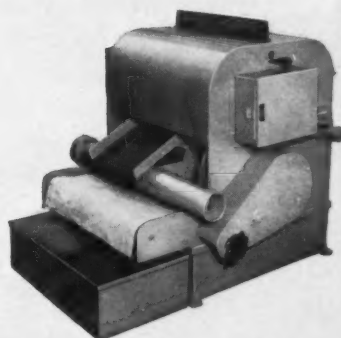


BARNES DRILL CO.

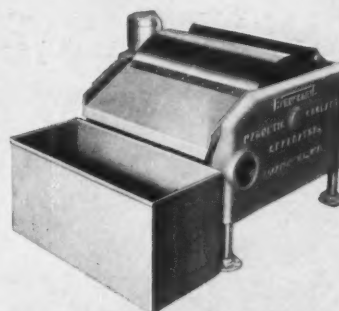
820 CHESTNUT STREET • ROCKFORD, ILLINOIS
 DETROIT OFFICE: 3419 SOUTH TELEGRAPH ROAD



FILTRATION DIVISION



KLEENALL Combination Fabric and Magnetic Tank Type Filter.



Magnetic Coolant Separator with Double Cleaning Action.

Machinery, September, 1955

FOR PRODUCTION MACHINE TOOLS IT'S

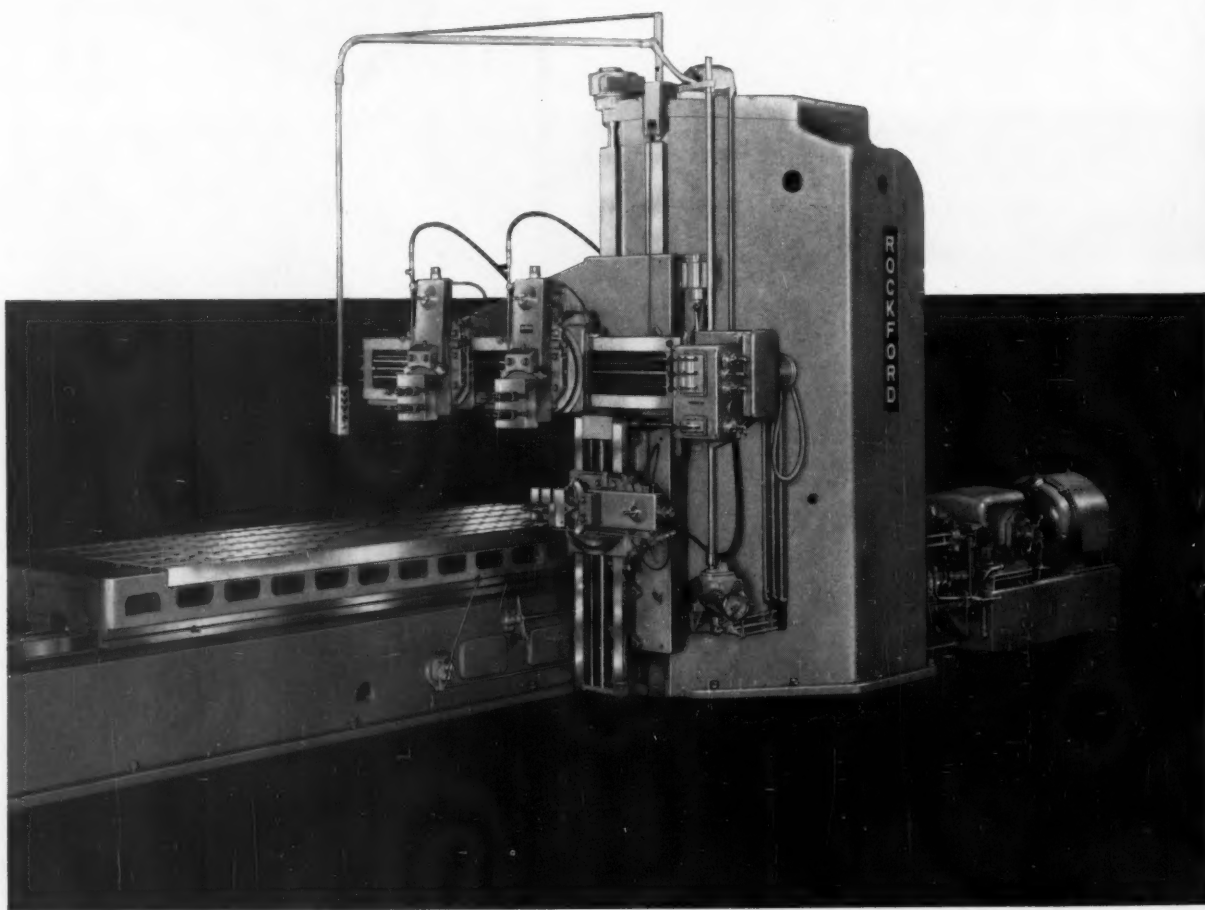
ROCKFORD, ILLINOIS, U.S.A.



hydraulic

drive and feeds

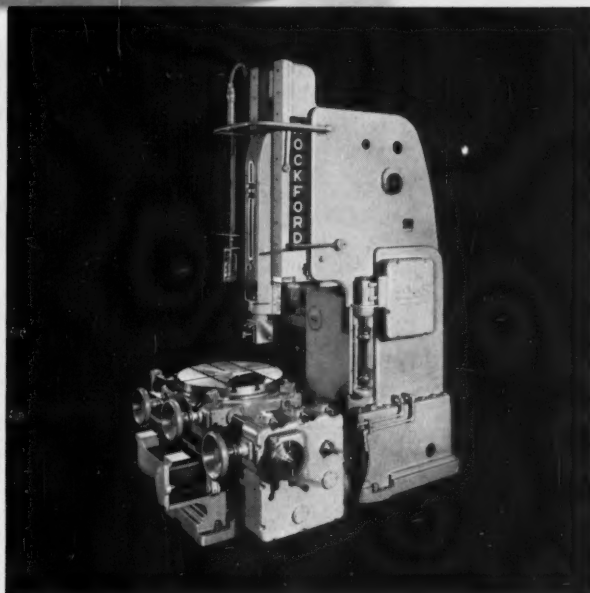
Hydraulic Drive and Feeds
—as a basic feature of
modern machine tool design—
assures outstanding performance,
measured in terms of fine work quality,
high production
and low operating cost.



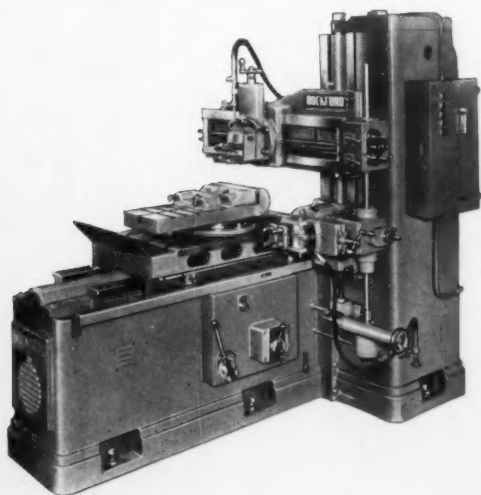
Machinery, September, 1955

MACHINES DESIGNED TO MEET YOUR NEEDS

ROCKFORD, ILLINOIS, U.S.A.



See the latest model
"Hydraulic" Machines
in action at Booth
No. 1423. Ask any Rockford
Machine Tool Co.
representative for
complete details on
the greater profits
that can be obtained
with "Hydraulic" Shapers,
Planers, Slotters,
Shaper-Planers
and Kopy-Kats.



Hy-Draulic

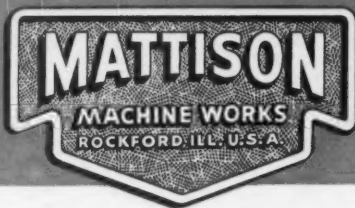
ROCKFORD MACHINE TOOL CO.
2500 KISHWAUKEE STREET • ROCKFORD, ILLINOIS

Machinery, September, 1955

FOR PRODUCTION MACHINE TOOLS IT'S

ROCKFORD, ILLINOIS, U.S.A.





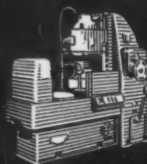
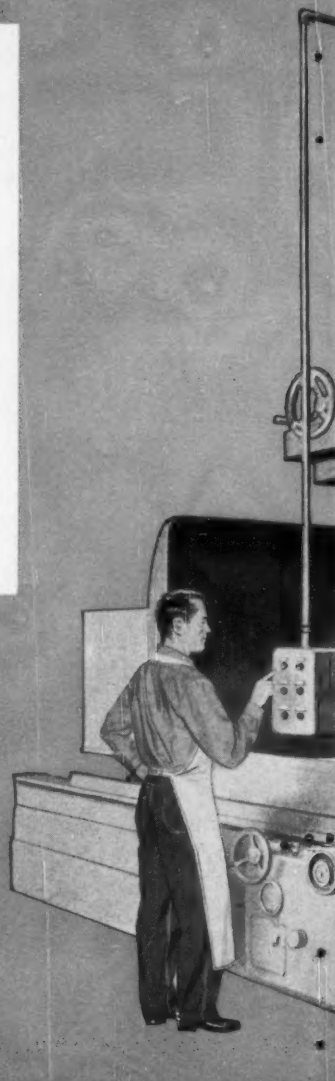
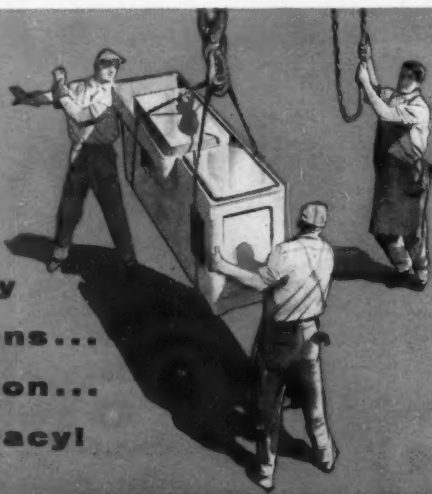
ANNOUNCES- FOR

NEW COMBINATION WAY AND SURFACE GRINDER

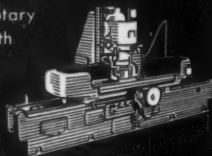
It's a machine tool builder's machine—a new "single-setup" method for precision grinding large bed castings, columns, tables, slides, saddles, and heads faster . . . to closer tolerances . . . without costly rehandling! With independent vertical and horizontal spindles, the machine can grind "V" and flat ways, dovetails, shoulders, edges, radii, and contours . . . all in the same setup . . . holding two or more surfaces in exact relative alignment. New three-column, box-type construction assures maximum stock removal rates and improves control over finish. Entire machine is electrically controlled from the pendant.

We would welcome the opportunity to demonstrate this machine to you at the Show. Other high-powered surface grinders sketched below will be running in Mattison's Booth—No. 1422.

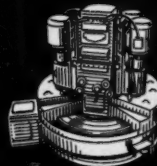
**eliminates costly
manual operations...
speeds production...
increases accuracy!**



No. 24—Vertical Rotary
Surface Grinder With
Automatic Cycling



No. 400SS—Vertical
Spindle Reciprocating-
Type Surface Grinder



No. 72—Four-Spindle,
Rotary Automatic High-
Production Surface Grinder

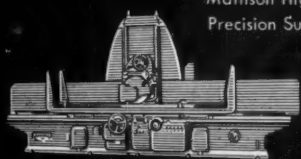
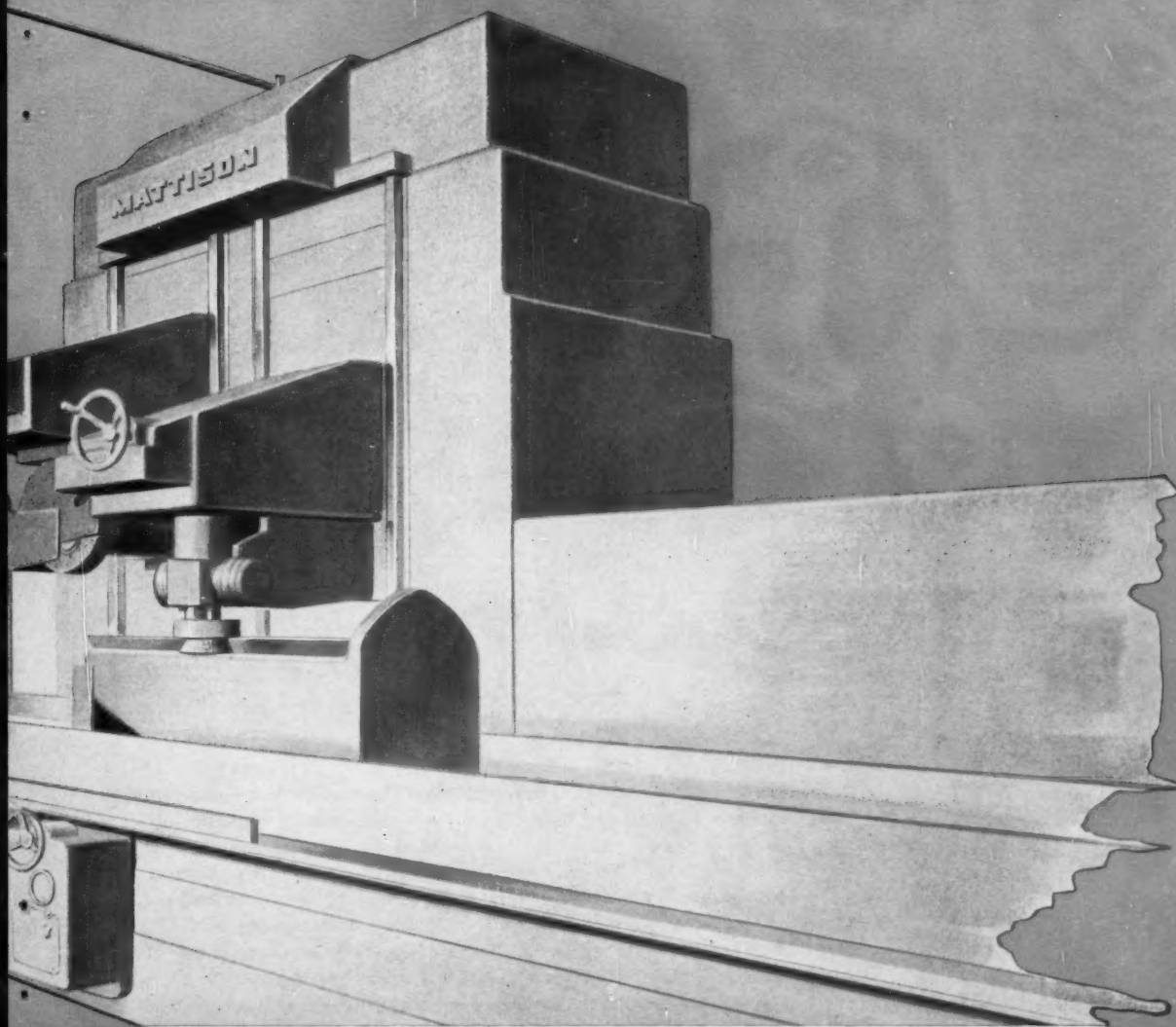
SEE THESE MATTISON HIGH-POWERED, PRECISION



Machinery, September, 1955

MACHINES DESIGNED TO MEET YOUR NEEDS ROCKFORD, ILLINOIS, U.S.A.

"WORLD'S BEST INVESTMENT" MACHINE TOOL BUILDERS!



Mattison High-Powered
Precision Surface Grinder



**HIGH-POWERED
PRECISION
SURFACE GRINDERS**

GRINDERS IN OPERATION AT THE SHOW, BOOTH 1422

Machinery, September, 1955

FOR PRODUCTION MACHINE TOOLS IT'S **ROCKFORD, ILLINOIS, U.S.A.**



a *NEW* automatic high-speed hobbing machine...



The Barber-Colman No. 3-6 Vertical Hobbing Machine is a single-purpose machine designed and built to meet the requirements of a specific job. The machine has standard basic elements, but the tooling, loading, gaging and handling are designed for maximum production of a specific part. Its high-speed operation makes it adaptable to all mass produced parts up to 3" diameter by 6" face width. Maximum pitch capacity is 10 DP. Hob speeds for carbide hobbing of non-ferrous and non-metallic blanks are available. Features which contribute to the high-speed operation of this machine include exceptionally large heat-treated and ground bed ways, short drives to the work and hob spindles, and a hardened and ground multiple-thread index worm.

In operation at the machine tool show . . . Booth No. 1322, Amphitheater

The No. 3-6 will be in production operation at our booth. Drop in and see it work. Get full information and literature there, with estimates for your jobs.

B U I L D E R S O F P R E C I S I O N G E A R



Machinery, September, 1955

MACHINES DESIGNED TO MEET YOUR NEEDS **ROCKFORD, ILLINOIS, U.S.A.**

BARBER • COLMAN

No. 3-6

*for high production
gear cutting
with automatic handling,
loading and gaging*

automatic loading

Blanks are automatically loaded from a vibratory hopper loading device. However, the type and variety of loading and handling devices with which this machine can be equipped are almost unlimited. Loading can be by magazine or conveyor when required.

automatic gaging

The gaging mechanism segregates gears of the correct size from those that are oversize or undersize. Size inspection is made by measuring over balls. If a pre-determined percentage of gears are out of tolerance, the machine can be made to stop automatically. The gaging unit can be furnished to inspect almost any elements of the gear.

automatic hob shifter

The automatic hob shifter can be set to shift a certain amount after each cycle, or it can be arranged to shift after a certain number of parts have been cut. Shifting increments can be changed easily by means of a graduated dial. The hob slide is clamped pneumatically.

centerdistance adjustment

The hob is set to the proper depth by means of a centerdistance adjusting mechanism, eliminating the usual time-consuming method of setting the hob to depth. The hob is placed in a fixture, and an indicator finger is set against the outside diameter. The indicator is calibrated to show the centerdistance between the work and the hob. This centerdistance setting is made by means of a graduated dial on the machine.

Some basic machine facts:

- Short, Compact Drives to Work and Hob Spindles
- Anti-Friction Work and Hob Spindle Bearings—Tapered Roller Type
- Pneumatic Work Clamping
- Self-Contained Lubrication and Coolant Supply
- Heat-Treated and Ground Bed V-Ways
- 2 HP, 1800 RPM Drive Motor
- Unitized Construction

HOBS • CUTTERS • REAMERS
HOBBING MACHINES
HOB SHARPENING MACHINES



Barber-Colman Company

GENERAL OFFICES AND PLANT, 629 ROCK STREET, ROCKFORD, ILL.

H O B S A N D M A C H I N E S S I N C E 1 9 1 1

Machinery, September, 1955

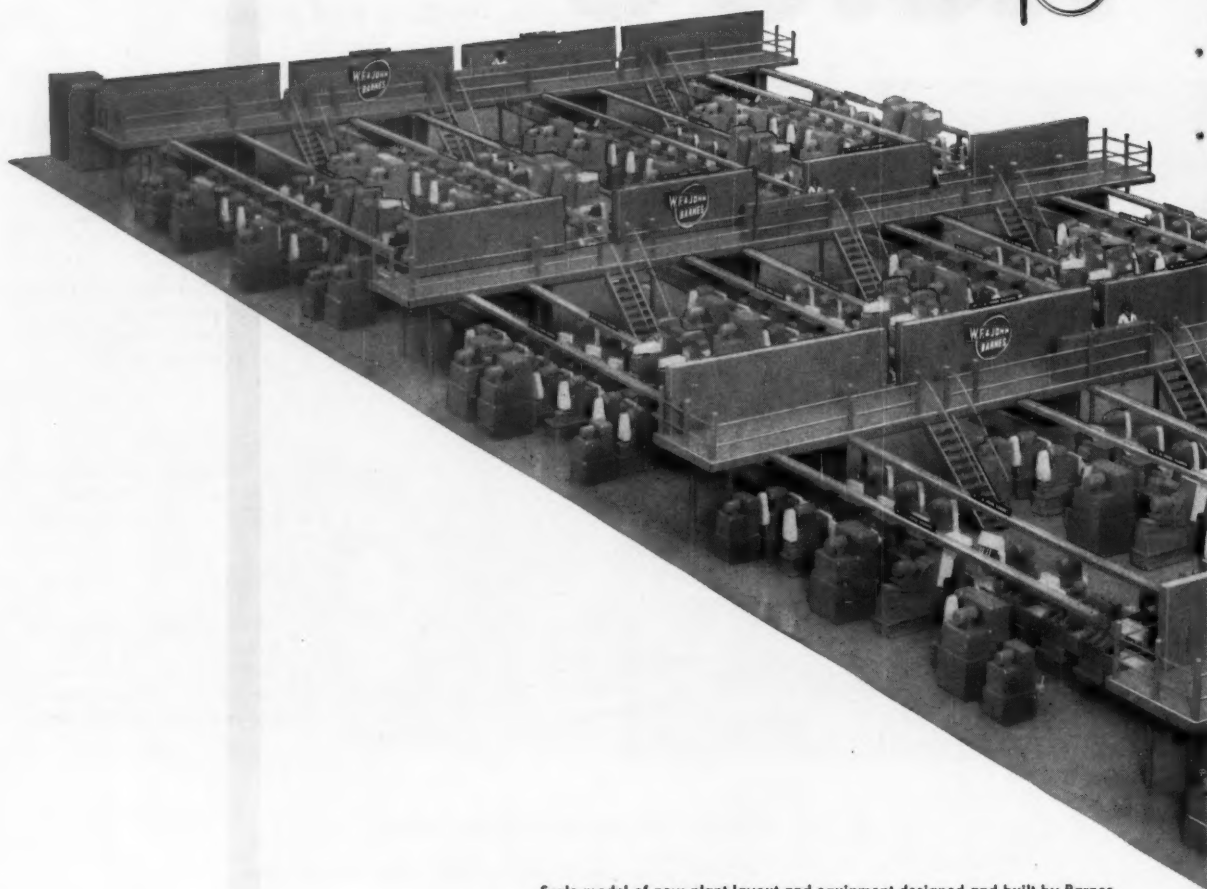
CITY OF MACHINE-TOOL SPECIALISTS

ROCKFORD, ILLINOIS, U.S.A.

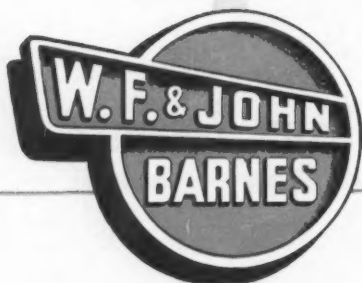


SEE THE LATEST in

at booth 1223



Scale model of new plant layout and equipment designed and built by Barnes for the automatic machining of automobile cylinder heads. Line provides for Automatic Storage Conveyors and Electro-Graphic Maintenance Detector Systems for each section. Estimated total production output is 400 cylinder heads per hour, or 100 heads per hour per line at 100% efficiency.



Builders of Better Machines and Equipment Since 1872



Special
Machine Tools



Special
Conveyor Units



Special
Process Equipment

MULTIPLE SPINDLE DRILLING • BORING • TAPPING MACHINES



Machinery, September, 1955

CENTER OF MACHINE-TOOL EXCELLENCE

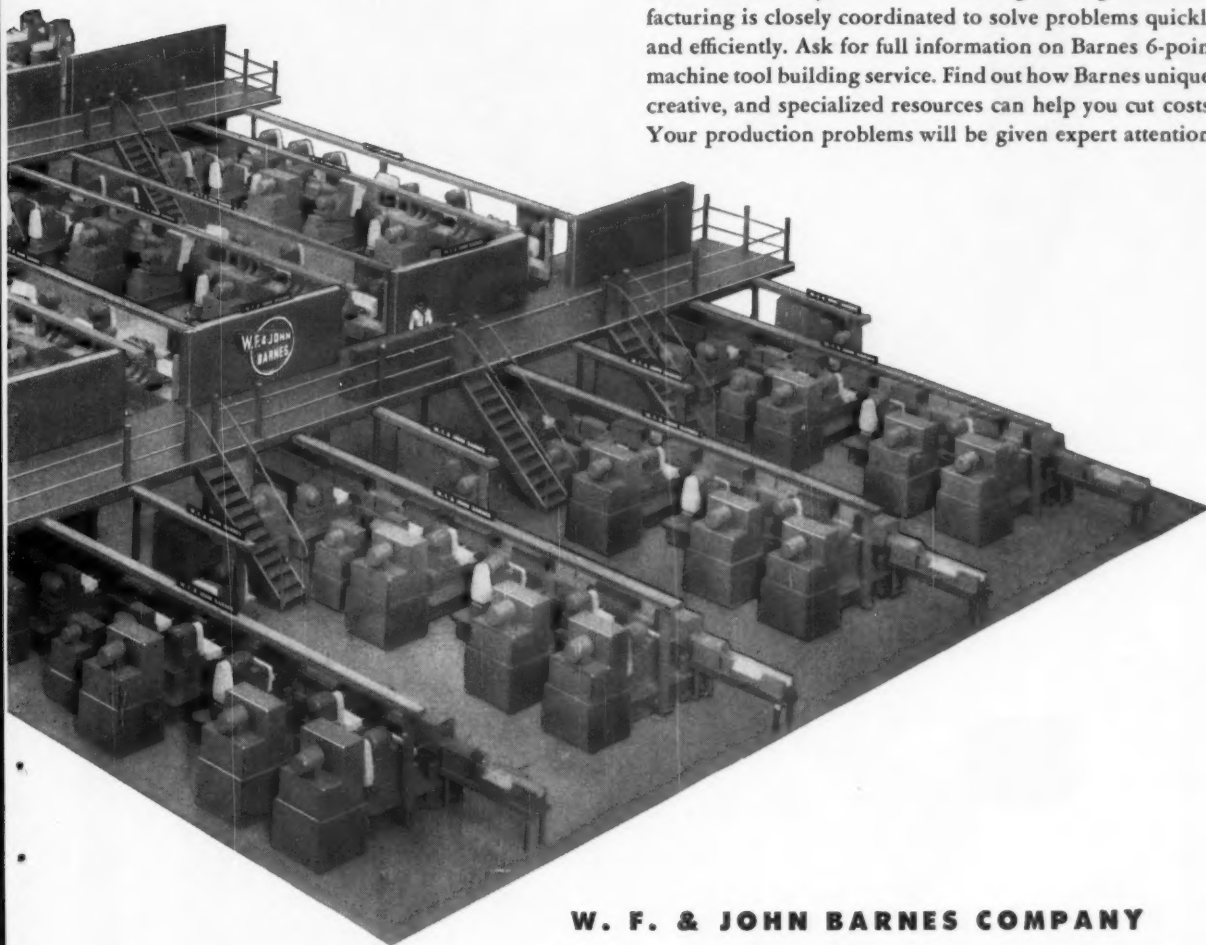
ROCKFORD, ILLINOIS, U.S.A.

Mass Machining Methods

The latest developments in machine design applied to the complete machining of an automobile cylinder head will be exhibited by W. F. & John Barnes Company for the first time at the Machine Tool Show. You will see how skillful planning of plant layout may be combined with modern machining methods to effect substantial reductions in plant operating costs.

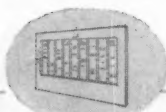
Get Full Information on Advantages of Barnes 6-Point Coordinated Machine Tool Building Service

This type of machine tool engineering and building service is available to you at Barnes. All engineering and manufacturing is closely coordinated to solve problems quickly and efficiently. Ask for full information on Barnes 6-point machine tool building service. Find out how Barnes unique, creative, and specialized resources can help you cut costs. Your production problems will be given expert attention.

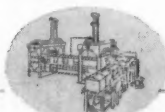


W. F. & JOHN BARNES COMPANY

402 SOUTH WATER STREET, ROCKFORD, ILLINOIS



Special
Electrical Controls



Food
Machinery

AUTOMATIC PROGRESS-THRU AND TRANSFER TYPE MACHINES

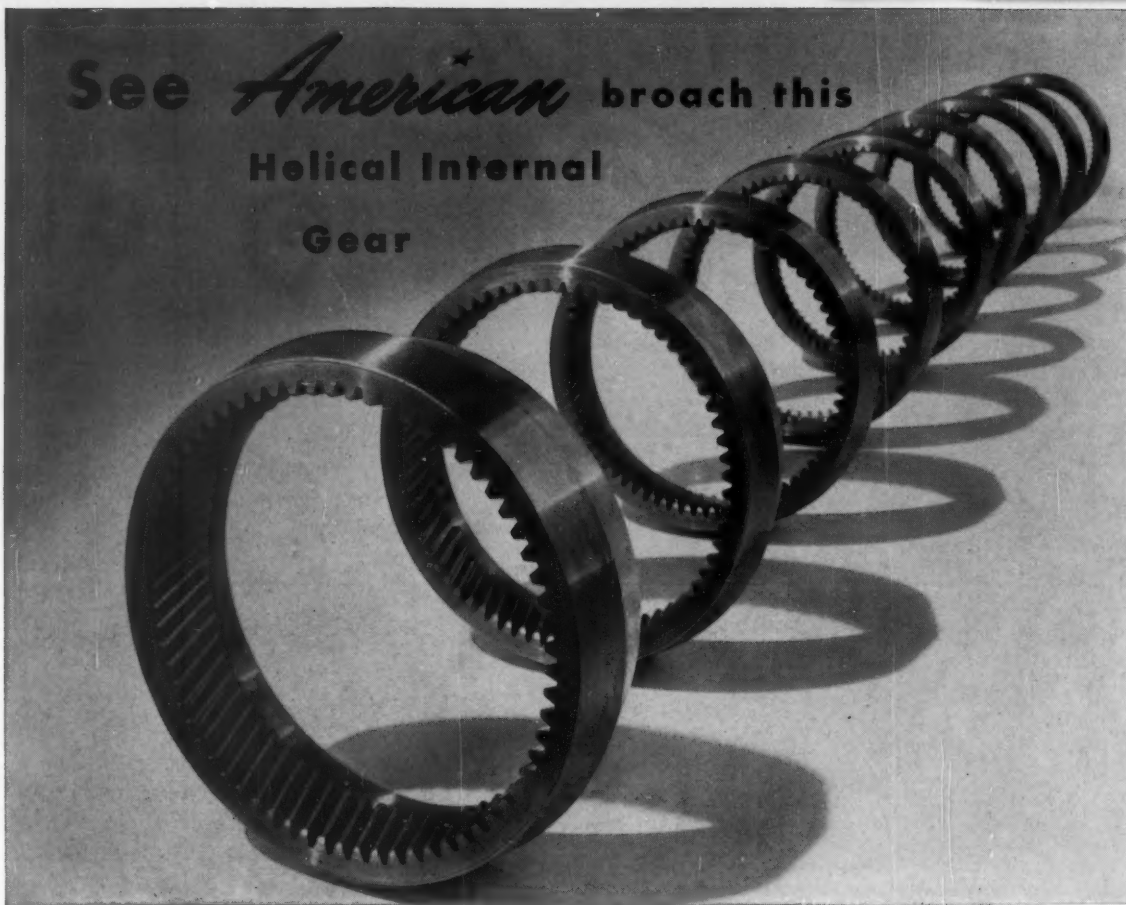
Machinery, September, 1955

CITY OF MACHINE-TOOL SPECIALISTS

ROCKFORD, ILLINOIS, U.S.A.



See *American* broach this
Helical Internal
Gear



AT BOOTH 1412 — MACHINE TOOL SHOW



American broaches the I.D. and 68 internal gear teeth in this 5½-inch diameter automotive transmission gear . . . does it fast and economically. You are cordially invited to see the machine and tooling in operation, as one of the many outstanding features of the Sundstrand and American Broach section at the show.



American **BROACH & MACHINE CO.**
A DIVISION OF SUNDSTRAND MACHINE TOOL CO.
ANN ARBOR, MICHIGAN

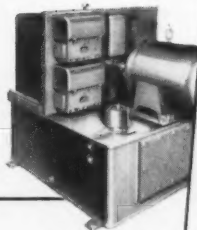
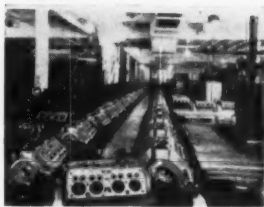
See *American* First — for the Best in Broaching Tools, Broaching Machines, Special Machinery



Machinery, September, 1955

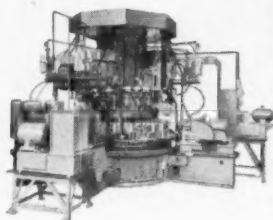
CENTER OF MACHINE-TOOL EXCELLENCE

ROCKFORD, ILLINOIS, U.S.A.

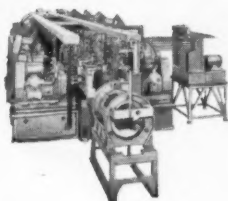


**Memo From
John S. Barnes Corporation**

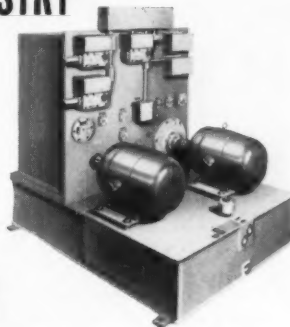
*Here is the story of a new
concept in hydraulic power
transmission and control.
Maintenance is simplified
to cut costs substantially.
Send for your copy today!*



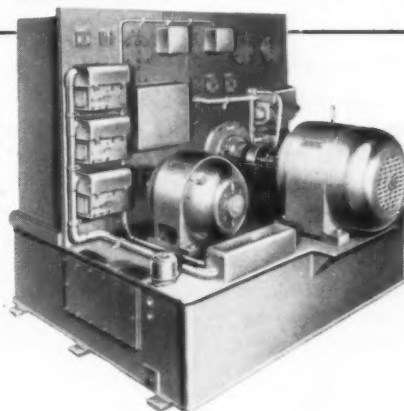
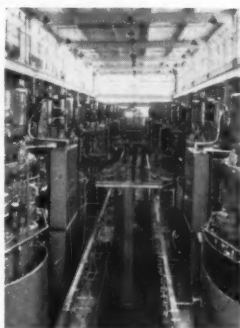
BARNES hydraulics in mass production INDUSTRY



**accurate,
low cost,
automatic control**



to give you perfect duplication of mass produced parts



JOHN S. BARNES CORPORATION / ROCKFORD, ILLINOIS

COPYRIGHT BY JOHN S. BARNES CORPORATION, ROCKFORD, ILLINOIS, 1955

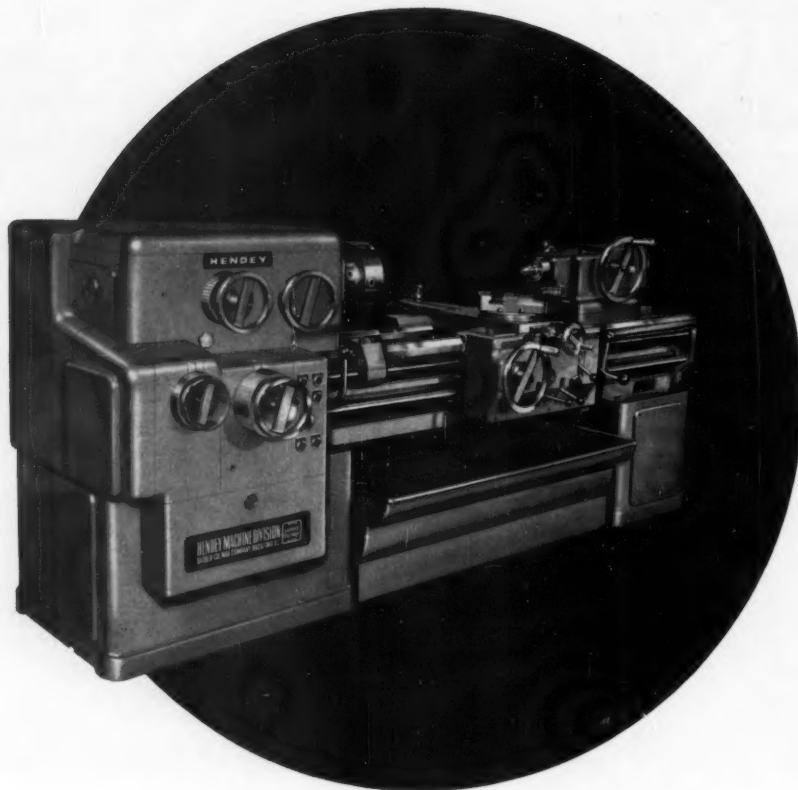
Machinery, September, 1955

CITY OF MACHINE-TOOL SPECIALISTS

ROCKFORD, ILLINOIS, U.S.A.



two new *Henley* lathes...



32-Speed Geared Head Lathe

This completely new lathe has a 32-speed headstock with the top eight speeds obtained through a belt drive to assure smooth finish on the work. This machine is equipped with a 15 HP motor, and spindle speeds up to 1500 RPM are available. It is designed to accommodate a 20 HP motor for spindle speeds to 2000 RPM. It can be furnished in 13", 16" and 20" sizes. Exclusive induction hardened and precision ground bed ways provide maximum accuracy and long life. Other features include 66 thread and feed changes, an independent lead screw, automatic lubrication, high-speed reversing mechanism, precision automatic stops, and heavy-duty, two-speed tail stock.



See them in action in Booth No. 221

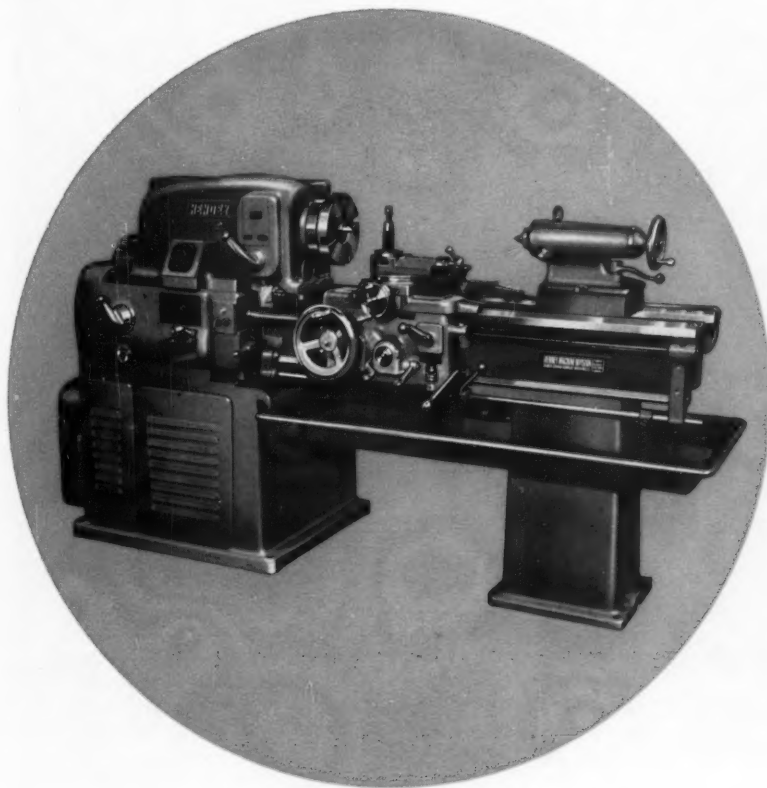


Machinery, September, 1955

CENTER OF MACHINE-TOOL EXCELLENCE

ROCKFORD, ILLINOIS, U.S.A.

for greater accuracy and production



No. 2E Precision Lathe

The new No. 2E Hendey Lathe is a 14" general-purpose precision lathe equipped with "Selectronic" control of spindle speeds. The electronic unit provides closer control over cutting speeds and full torque at slow speeds. It is an exclusive Hendey feature and is custom built for this lathe. Speeds may be pre-set or changed while cutting, and they are infinitely variable from 15 RPM to 1500 RPM. Low speeds are available through back gears. The spindle starts, stops, and reverses with a single lever control. Other features include dynamic braking, automatic lubrication, precision spindle bearings, and hardened and ground bed ways.

These new modern lathes are Barber-Colman's answer to any questions concerning the future of the Hendey line. They are proof of the strides we have already made and indicate the continued progress which we guarantee in the future. For years Hendey has had a reputation for accuracy. Now, new machines and features provide even closer limits of accuracy and greater production. Electronic and magnetic amplifier drives, induction hardened and precision ground bed ways, and a 32-speed geared head-stock are only a few of the new features available on Hendey lathes. See these new machines in action to determine how they can fill your production requirements.

Hendey machine division
BARBER-COLMAN COMPANY
115 LOOMIS ST., ROCKFORD, ILLINOIS



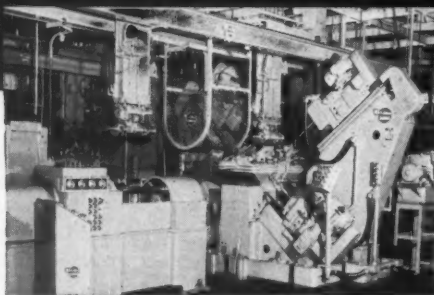
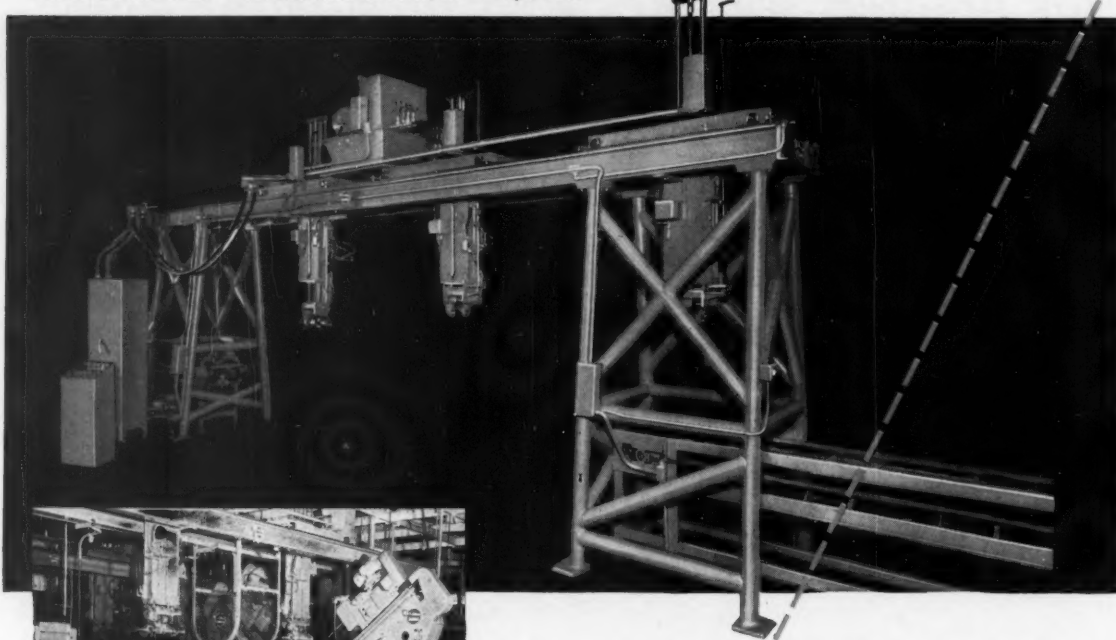
Machinery, September, 1955

CITY OF MACHINE-TOOL SPECIALISTS **ROCKFORD, ILLINOIS, U.S.A.**



production efficiency *increased*

See us at Booth 1223 • THE MACHINE TOOL SHOW • Sept. 6-17



View of Special Barnes Handling Unit, Crankshaft Balancing and Barnes Drilling Machines in automobile plant. After crankshafts are conveyed to load station and manually positioned for pick-up, operating sequence is as follows: (1) Three overhead pick-up units descend, grasp workpieces, and automatically rise simultaneously to traverse position. Left-hand unit picks up unbalanced crankshaft at loading station. Center unit removes piece from Balancer and right-hand unit removes part from Drilling Machine; (2) all units traverse one station to the right and descend. This positions a new workpiece in the Balancing Machine, transfers workpiece in the Drilling Machine, and a finished part on a discharge conveyor; (3) all units automatically rise and return to initial starting position. Complete Barnes equipment also includes electrical controls, and special in-feed and discharge conveyors.

ANOTHER EXAMPLE OF PROCESS EQUIPMENT DESIGNED AND BUILT BY W. F. & JOHN BARNES

The automatic work handling equipment shown above is one of three machines designed and built by Barnes for an automobile manufacturer. This equipment automatically transfers crankshafts between the rough Balancing and Barnes Drilling Machines. By eliminating manual loading and unloading, a substantial increase in production efficiency over previous methods is effected. With this specially designed and engineered equipment, one operator now handles the entire balancing and drilling operations. All units are electrically interlocked and timed in sequence with overall production requirements.

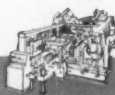
You will find the varied engineering and creative skills at Barnes that are necessary to design and build this type of process equipment. These skills are the result of over 80 years of machine building experience. All planning, engineering, and manufacturing efforts are closely coordinated in one plant. You get a complete, dependable service from one source with no divided responsibility.



ASK FOR AN ANALYSIS OF YOUR WORK HANDLING METHODS
Find out how this specialized engineering and building service can help you cut costs. Write today for an analysis of your production methods or ask for new 16-page catalog entitled "Automatic Process and Transfer Equipment."

W. F. & JOHN BARNES CO. • PROCESS EQUIPMENT DIV.
416 SOUTH WATER STREET, ROCKFORD, ILLINOIS

Multiple Spindle
Machine Tools



Special
Transfer Equipment



Special
Electrical Controls



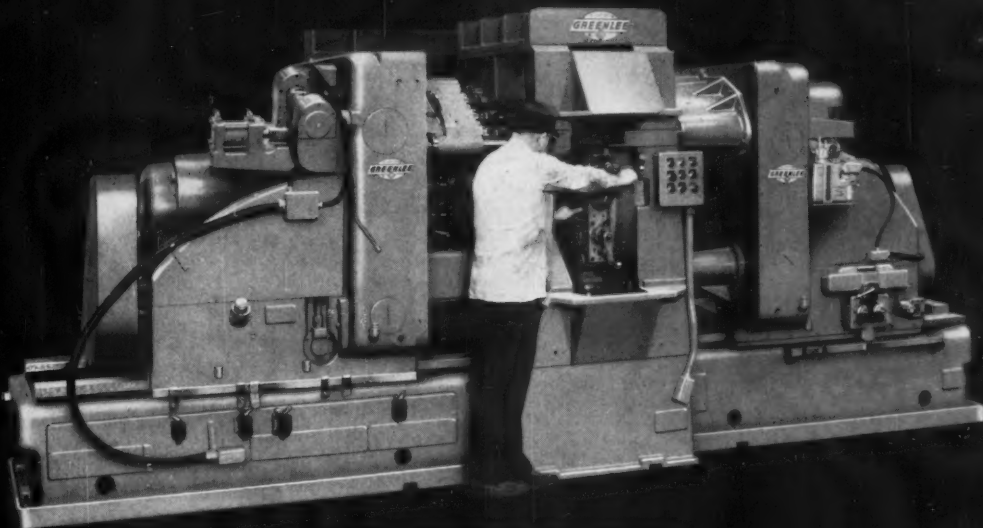
BUILDERS OF BETTER MACHINES AND EQUIPMENT SINCE 1873



Machinery, September, 1955

CENTER OF MACHINE-TOOL EXCELLENCE

ROCKFORD, ILLINOIS, U.S.A.



GREENLEE

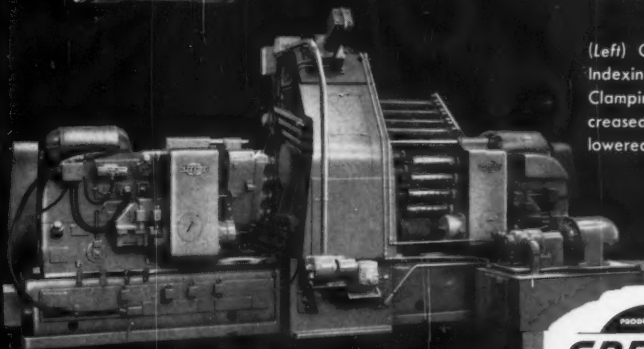
special-purpose machines for profitable mass production



Master brake cylinder
machined on above
Greenlee Special Machine.



Wheel cylinder machined on
Greenlee Special Machine
shown below.



WRITE FOR COMPLETE INFORMATION

THEY SAVE WORK...THEY SAVE MONEY

If you are being outdistanced in today's swift race for production...faced with narrowing profit margins...it will pay to investigate Greenlee Special Machines. Savings effected on drilling, reaming, boring, counterboring and tapping operations will quickly amortize your invested dollars.

(Above) Greenlee Horizontal Indexing Machine designed for processing master brake cylinders has proved itself with raised quality and lowered costs.

(Left) Greenlee Two-Way Horizontal Indexing Machine equipped with Power Clamping and Automatic Unloading increased previous production rates and lowered costs.



**GREENLEE
BROS. & CO.**

1809 MASON AVENUE
ROCKFORD, ILLINOIS

Machinery, September, 1955

FOR PRODUCTION MACHINE TOOLS IT'S **ROCKFORD, ILLINOIS, U.S.A.**



See these new

SUNDSTRAND

Machines *in action* at the
Machine Tool Show

Sept. 6-17, 1955

International
Amphitheatre

Chicago, Illinois

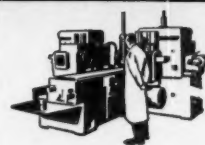
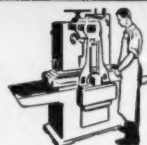
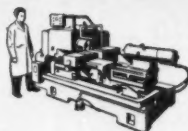
**BOOTH
1412**



AUTOMATIC LATHES | SIMPLEX RIGIDMILS | DUPLEX RIGIDMILS

SUNDSTRAND

50 YEARS OF
*"Engineered
Production"
Service**
*REG. U.S. PAT. OFF.



Machinery, September, 1955



MACHINES DESIGNED TO MEET YOUR NEEDS

ROCKFORD, ILLINOIS, U.S.A.

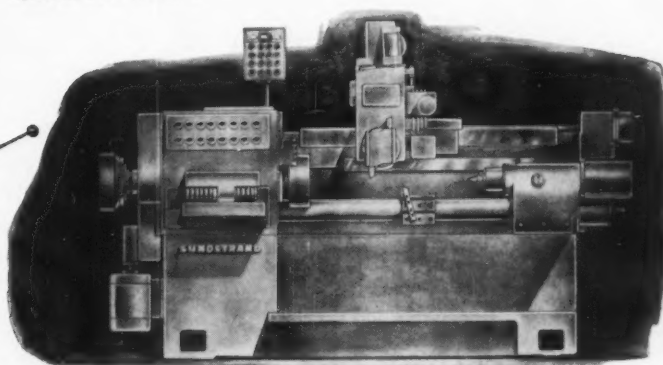
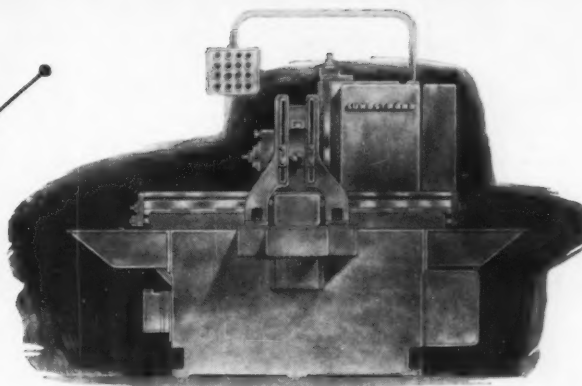
See In Action

- 1 The new line of Sundstrand Rigidmils
- 2 Punch card control of a multi-cycle lathe
- 3 Carbide milling of die blocks
- 4 Tracer turning with the new Sundstrand Automatic Multi-Cycle Tracer Control Unit
- 5 Low cost milling and centering of shafts

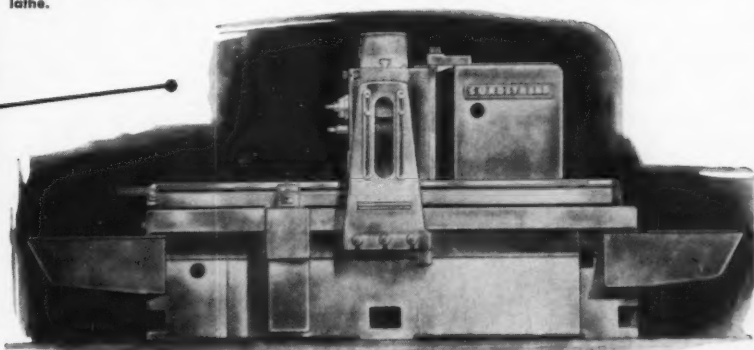
... Get an "Engineered Production"

analysis of how these new machines can improve your production and lower costs.

New 5 H.P. Model C1
Hydraulic Feed RIGIDMIL

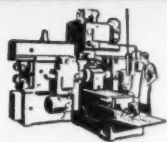


New 40 H.P. multi-cycle
single point production
lathe.

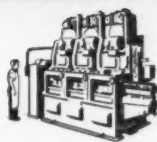


New Model C3 RIGIDMIL
with mechanical feed.

TRIPLEX RIGIDMILS



SPECIAL MACHINES



SUNDSTRAND
Machine Tool Co.

2530 Eleventh St. • Rockford, Ill., U.S.A.

Machinery, September, 1955

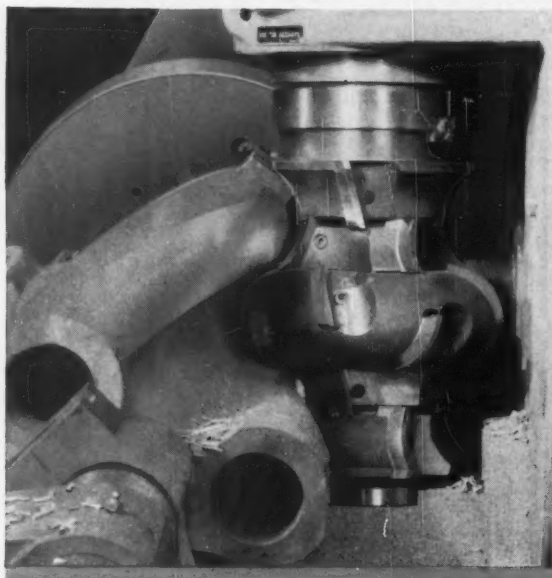
FOR PRODUCTION MACHINE TOOLS IT'S **ROCKFORD, ILLINOIS, U.S.A.**



INGERSOLL

Special Cutters

**Greater Economy by Combining
Multiple Operations in One Pass**



In one pass, a gang of five specially designed Ingersoll roughing cutters with carbide-tipped blades completely machines lobe of diesel locomotive blower rotor.



Write for Catalog 60B describing Ingersoll inserted blade special cutters, the complete line of standard cutters and recommended cutter grinds.

Ingersoll Special Cutters are individually designed to meet the exact requirements of many complex milling and boring operations. For performance and economy, these cutting tools have low-cost replacement blades and are designed to permit use of cutter gangs or combination tools to do several operations in one pass.

While Ingersoll produces a wide variety of standard inserted blade milling and boring cutters, the design and manufacture of special cutters is a substantial part of the company's business. Ingersoll offers you the benefits of modern, efficient production equipment and 65 years of experience in building good cutters economically.

Ingersoll cutter engineers will study details of your work and recommend Special Cutters to answer your specific production needs.

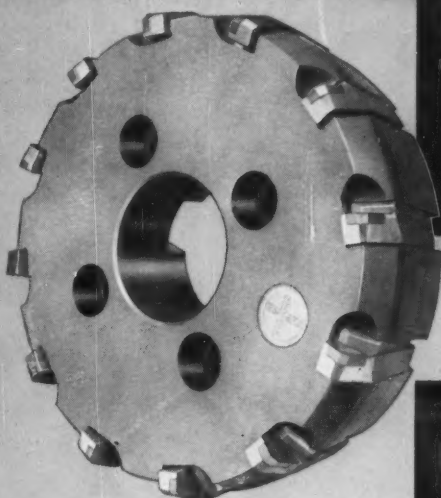
THE **INGERSOLL**
MILLING MACHINE COMPANY
ROCKFORD, ILLINOIS, U. S. A.

BUILDERS OF SPECIAL DESIGN MILLING & BORING MACHINES
ORIGINATORS OF *SHEAR CLEAR* CUTTERS



Machinery, September, 1955

MACHINES DESIGNED TO MEET YOUR NEEDS **ROCKFORD, ILLINOIS, U.S.A.**



KROSLOK[®] MILLING CUTTERS

GROUP IMPORTANT CONCEPTS
FOR *Higher Production*

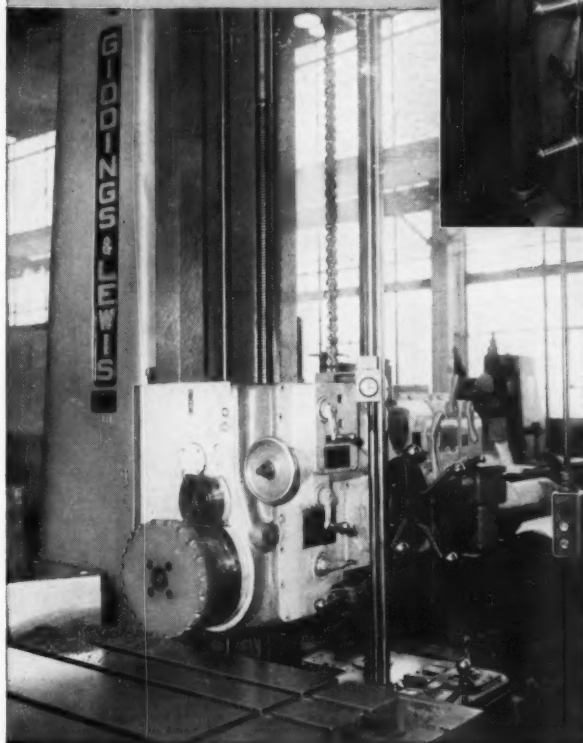
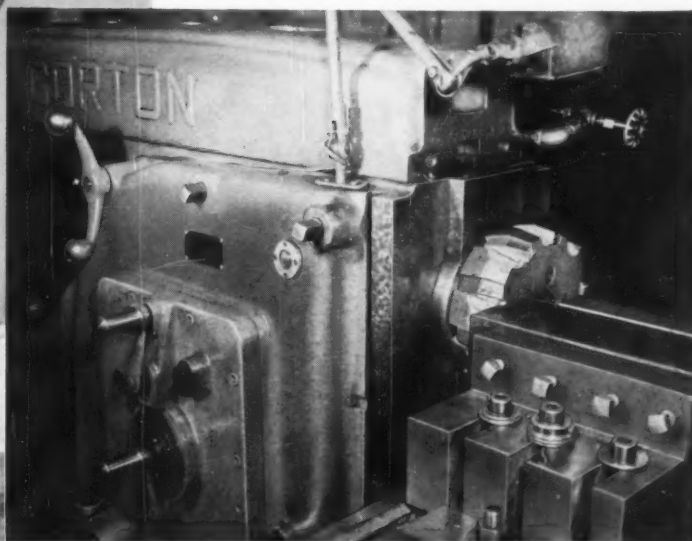
TOP FEEDS
AND SPEEDS

**RUGGED
RIGID**

ONLY 3
MEMBERS

See Kroslok in action
at Booth 606

Machine Tool Builders Show, Chicago



Production milling requires
"tops" in production tools.

Production milling realizes a new high with Kroslok face milling cutters and shell end mills. Simplicity of design (only three members), extreme ruggedness and rigidity, merit your thorough investigation. Kroslok is available in general purpose and heavy duty types for ferrous or non-ferrous metals, with both fine tooth and extra fine tooth variations, in diameters from 3" through 24". May we suit Kroslok's advantages to your job?

**THE
MOTCH & MERRYWEATHER
MACHINERY Co.**

CUTTING TOOL MANUFACTURING DIVISION

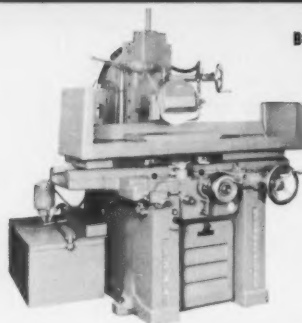
CLEVELAND 17, OHIO

Stocking Dealers in All Industrial Centers

TRIPLE-CHIP CIRCULAR SEGMENTAL AND SOLID CUT-OFF BLADES • TRIPLE-CHIP
SLITTING SAWS • TRIPLE C GRINDING COOLANT • TRIPLE-CHIP SOLUBLE OIL

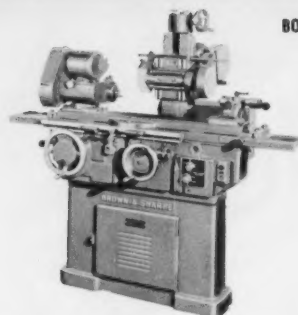
Look for **CARBORUNDUM®** at the Machine Tool Show

...ON THE LEADING



BOOTH NO. 317

ABRASIVE MACHINE TOOL CO. NO. 1224 HYDRABRASIVE SURFACE GRINDER



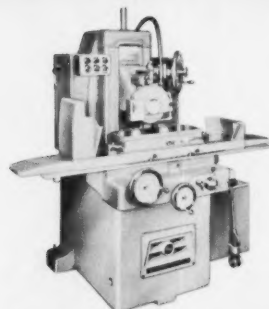
BOOTH NO. 520

BROWN & SHARPE NO. 13 UNIVERSAL OC TOOL GRINDING MACHINE



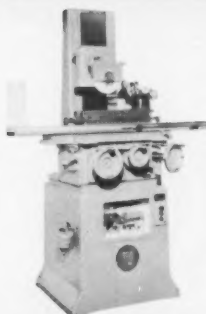
BOOTH NO. 1319

EX-CELL-O STYLE 46-D TOOL GRINDER



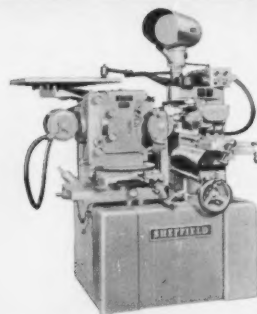
BOOTH NO. 906

GALLMEYER & LIVINGSTON NO. 350 SURFACE GRINDER



BOOTH NO. 100

REID NO. 618 SURFACE GRINDER



BOOTH NO. 1305

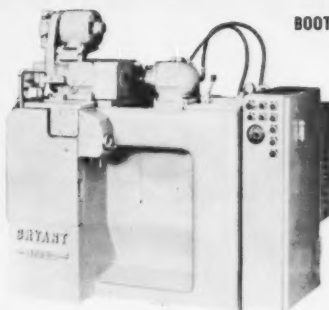
SHEFFIELD MODEL 122 MICRO-FORM GRINDER

THE NEWEST DEVELOPMENTS in grinding machines will be on display at the Machine Tool Builders Show in Chicago. See them all—and notice how many models of these modern machines are equipped with **CARBORUNDUM Brand Grinding Wheels**.

THE MACHINE BUILDERS' DECISION to use Wheels by **CARBORUNDUM** on their show machines is your most positive assurance that the brand name **CARBORUNDUM** means precision ... higher production ... lower cost per unit machined. For engineering helps on *your* specific grinding problems, ask your **CARBORUNDUM Distributor** or salesman.

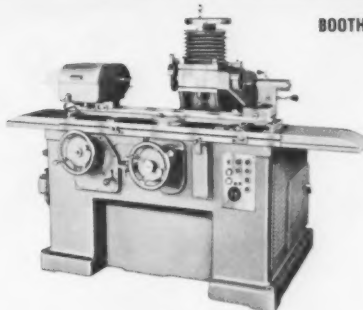
➡ Look for other **LEADING GRINDING MACHINES** featured in **CARBORUNDUM's** advertising in

GRINDING MACHINES



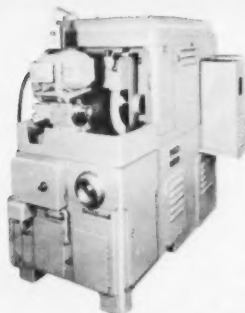
BOOTH NO. 1015

BRYANT NO. 1209 INTERNAL GRINDER



BOOTH NO. 720

COVEL NO. 32 UNIVERSAL AND TOOL GRINDER



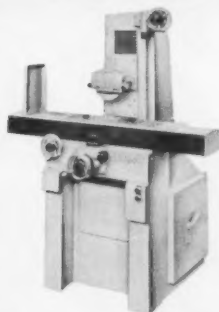
BOOTH NO. 1111

JONES & LAMSON MODEL "E" AUTOMATIC FORM GRINDER



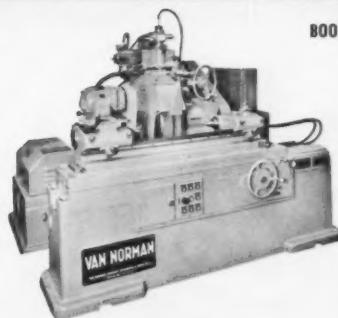
BOOTH NO. 604

OLIVER AUTOMATIC FACE MILL GRINDER



BOOTH NO. 1407

THOMPSON STYLE "D" 6 X 10 X 18" SURFACE GRINDING MACHINE



BOOTH NO. 905

VAN NORMAN NO. 48G1 BOW GAGE HIGH PRODUCTION PLUNGE CUT GRINDER

CARBORUNDUM

REGISTERED TRADE MARK

...continually putting more SENSE in your abrasive DOLLAR

AMERICAN MACHINIST and STEEL, Aug. 29; GRINDING & FINISHING, Aug.:

PRODUCTION and METAL WORKING, Sept.

81-512C

See the NEW Motch & Merryweather MILL-M-MATIC PRODUCTION MILL at ..



Use This
MILL-M-MATIC
to Increase
Your Milling
Production!

Model
5-M-1842
Mill-M-Matic

CENTRAL PENDANT CONTROL

25 H. P. SPINDLE DRIVE

MECHANICAL TABLE FEED

AUTOMATIC TABLE CYCLES

RIGID OVER-ARM

You owe it to your production program to get all the details on this new *heavy duty* series of bed-type Mill-M-Matics. They utilize 25 horsepower through the spindle drive. Electrically controlled movements are mechanical to insure maximum rigidity and effective production with accuracy. . . The new Mill-M-Matic is now offered in a full range of heavy duty sizes by Motch & Merryweather, foremost builder of *traveling head* milling machines.

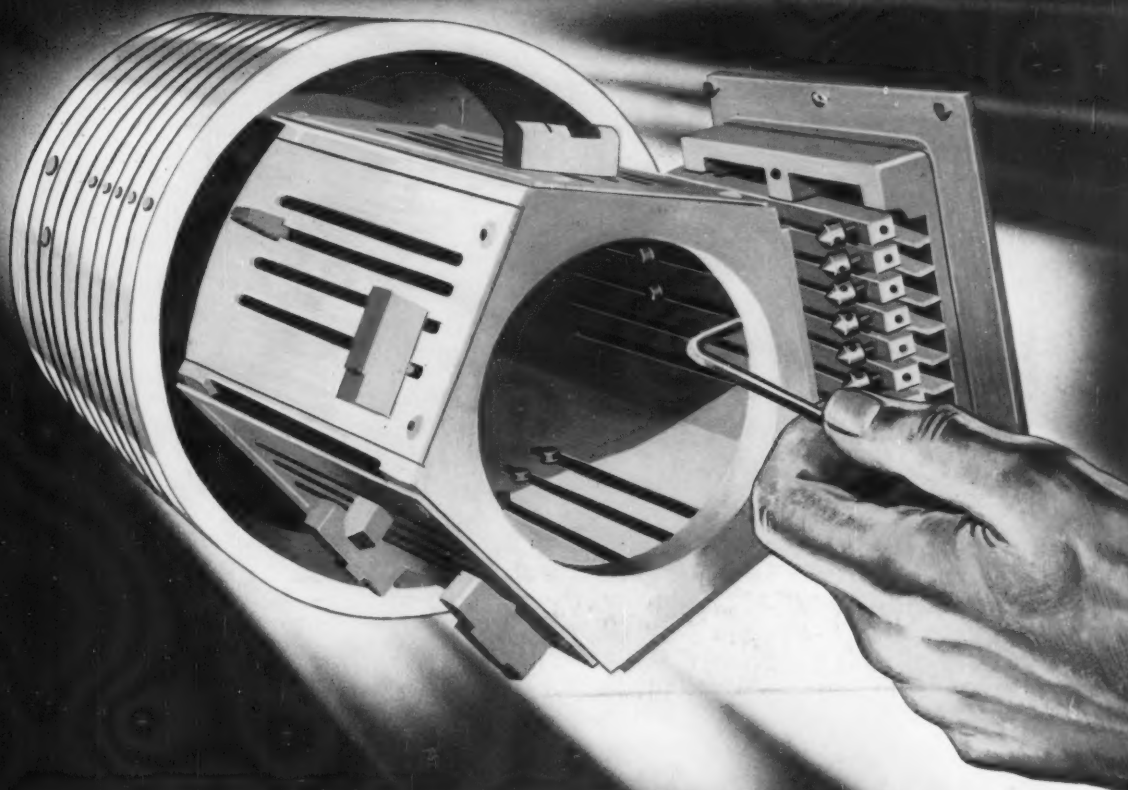
Copyrighted 1955 by The Motch & Merryweather Machinery Co.

THE MOTCH & MERRYWEATHER MACHINERY CO.

MACHINERY MANUFACTURING DIVISION

CLEVELAND 13, OHIO

Builders also of Circular Sawing Equipment, Vertical Turning, Automatic and Special Machines



AUTOMATICS
that crack the *break-even* barrier

Through their advanced design, Warner & Swasey
Automatics open for you unexplored areas of profit
in high precision, small lot production.

THE WARNER & SWASEY COMPANY • CLEVELAND 3, OHIO

SEE
WARNER & SWASEYS
IN OPERATION
ON TYPICAL
SHOP JOBS

THE
MACHINE TOOL
SHOW

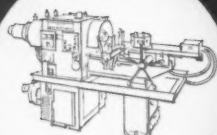
CHICAGO, ILL.
SEPT. 6-17, 1955
INTERNATIONAL AMPHITHEATRE



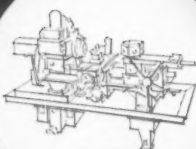
Most folks, we believe, go to the Machine Tool Show to take home ideas on how to do their own work more efficiently by seeing the latest machines and techniques available.

And we believe we can help you spend your time more profitably by showing you our machines turning the kind of jobs you encounter every day back home — the kind you're most interested in.

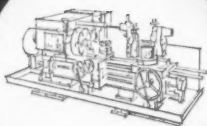
That's exactly what you'll see at the Warner & Swasey booth — the most modern machines available, utilizing the latest turning techniques, turning out typical shop jobs. You are cordially invited to visit us at 717.



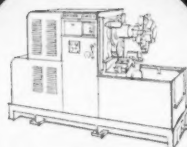
Electro-Cycle
Turret Lathes



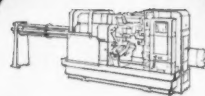
Ram Type
Turret Lathes



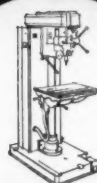
Saddle Type
Turret Lathes



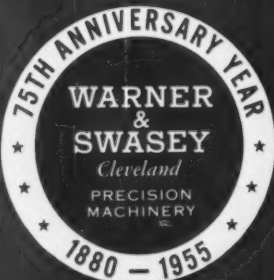
Single Spindle
Automatics



Multiple Spindle
Automatics



Precision Tapping
Machines



NO MATTER WHICH WAY YOU TURN...
WARNER & SWASEY CUTS COSTS

CARBOLOY ANNOUNCES 4 MAJOR NEW DEVELOPMENTS

1. Carboloy Machinability Computer

Available now. (See pages 2 and 3 of this 8-page advertisement.)

2. First Easy-To-Use Toolholders

Available now. (See pages 4 and 5 of this 8-page advertisement.)

3. Carbide Surfacing For Machine Parts

In field appraisal. (See page 8 of this 8-page advertisement.)

4. Cemented Oxide Cutting Tools

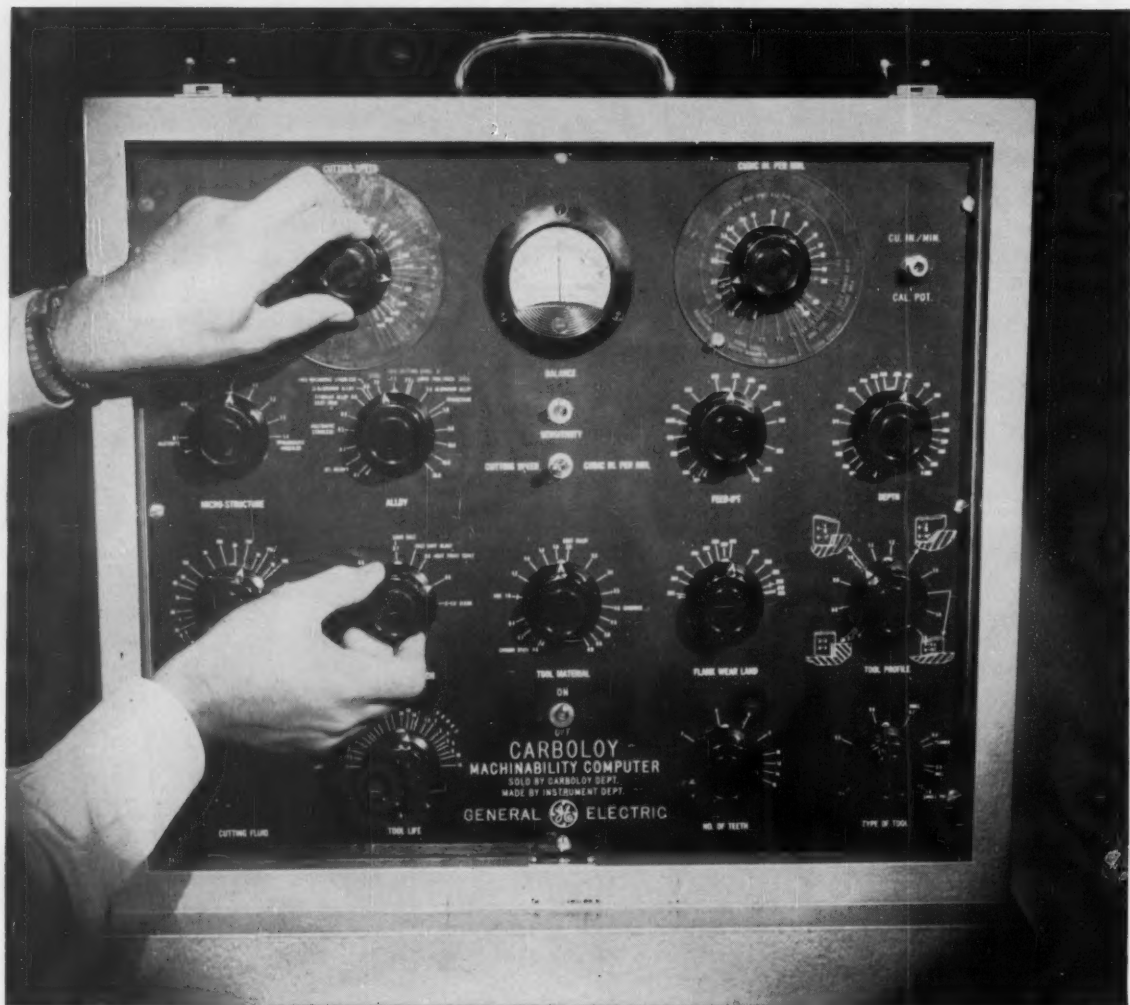
In laboratory appraisal. (See page 8 of this 8-page advertisement.)

**PLUS—INFORMATION ON CUTTING PRODUCTION COSTS WITH
CARBOLOY SERIES 300 STEEL-CUTTING CARBIDES**

**SEE THESE NEW DEVELOPMENTS AT THE
CHICAGO SHOWS—SEPTEMBER 6-16**

National Machine Tool Builders Show
(Booth No. 109)
and
Production Engineering Show
(Booth No. 665)

Carboloy announces the **CARBOLOY MACHINABILITY**



To find an unknown variable like speed, output, or motor horsepower, simply set dials according to known information. Then turn dial of unknown variable until meter (top, center) balances at zero setting. Computer instantly shows what happens when any of the variables listed below are changed.

Computes values for any of these 19 operating variables:

Material Cut:

Work material
Microstructure
Hardness
Surface condition

Cutting Tool:

Tool material
Tool life
Flank wear land
Tool profile
Type of tool
Number of teeth

Cutting Conditions:

| | |
|----------------|-------------------------|
| Cutting fluids | Motor horsepower |
| Feed | Cubic inches per minute |
| Depth of cut | Unit horsepower |
| Cutting speed | Work diameter |
| | R.P.M. |

COMPUTER

- New engineering tool solves complex machine setup problems in seconds, instead of hours
- Shows how to vary cutting conditions to increase machine, cutting tool, and operator efficiency

In seconds, the low-cost Carboloy® Machinability Computer calculates the effect of 19 basic machining variables on machine performance, tool life, and output.

In seconds, it shows optimum operating conditions for any metal-cutting job, eliminating wasteful experimental runs.

In seconds, it shows how to improve existing setups by the right variation of operating conditions.

Easy to use

The Carboloy Machinability Computer is easy to operate. Anyone with machining experience can use it after a short familiarization period.

Results are numerical—requiring no further interpretation from the direct-reading dials. Accuracy is assured—based on more than a year's testing on in-plant applications at key General Electric plants.

Handles many jobs

The Carboloy Machinability Computer handles basic information on operating conditions, type

and condition of work material, style and material of tools. The computer accurately predicts cubic inches per minute removed, tool life, and required machine horsepower. It shows how changing speed, feed, depth of cut, or tool material will affect these and other variables.

The Computer solves—in seconds—problems that would be otherwise impractical because of the large number of machining variables involved.

The Carboloy Machinability Computer was developed and proved in the field by a team of Carboloy and General Electric engineers, under the direction of Dr. W. W. Gilbert, of G.E.'s Manufacturing Services Division.

The Computer is portable (weighs only 32 lbs.), battery-operated, and measures 21" x 7" x 20".

The price of the Carboloy **\$495.**
Machinability Computer is ... (f.o.b. factory, Detroit)

Whether your plant is large or small, the Computer can bring you immediate benefits. Send the coupon on page 8 of this advertisement for complete information.



See the Carboloy Machinability Computer at the Carboloy Exhibits of Metalworking Progress

National Machine Tool Builders Show
and
Production Engineering Show
Chicago—September 6-16

◀ TYPICAL IN-PLANT COMPUTER APPLICATION

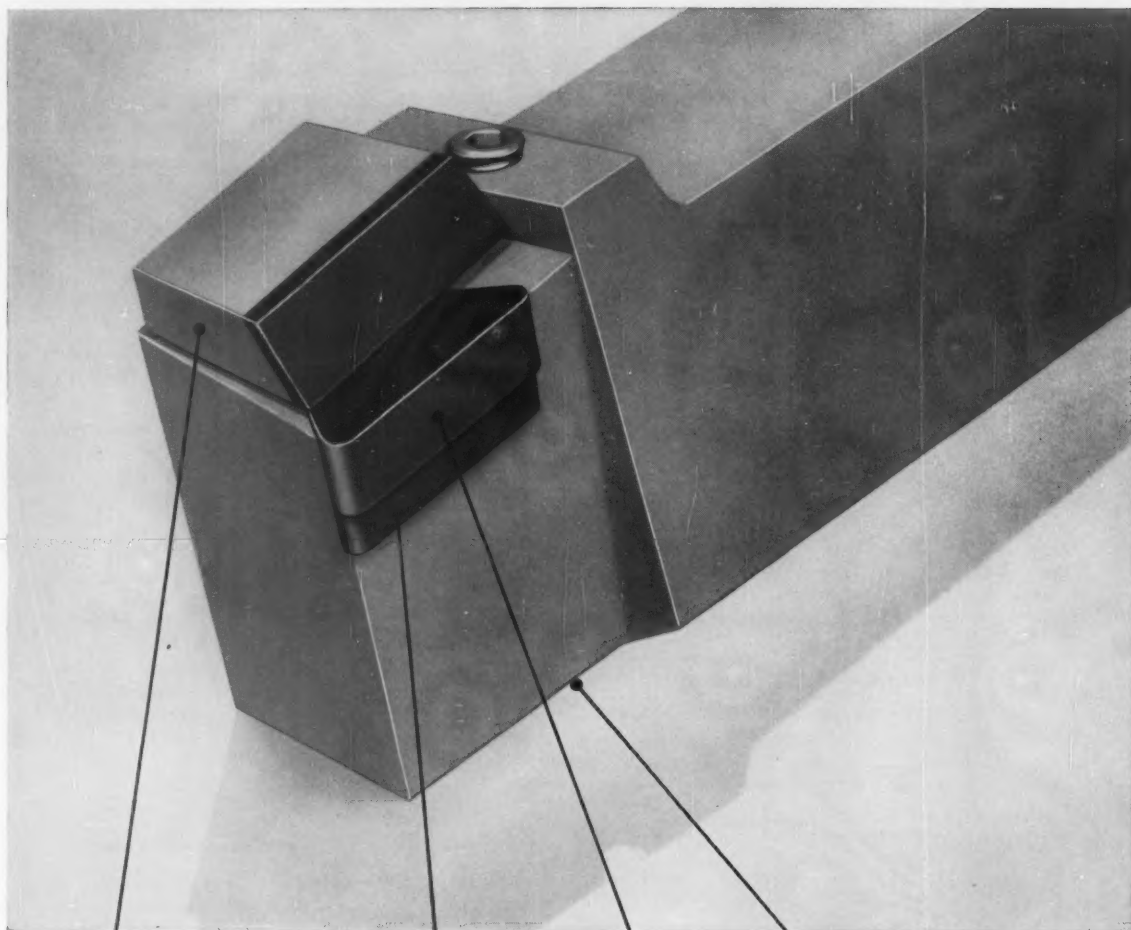
PROBLEM: Setting up 16", 10-HP lathe to turn hot-rolled 1020 steel bar with 10" diameter, to get tool life of 1 hour.

SOLUTION: Starting from scratch on a new setup, days could be used by experienced tool men to find a satisfactory set of operating conditions ... with no assurance that the result would be the best possible. With the computer, the optimum setup was established, and the effect of changing key variables compared, in less than 15 minutes.

BENEFITS: Computer turned lengthy setup time into valuable production time. On this job alone, the savings gained through days of extra production, plus savings in manpower costs, would more than equal the value of the computer.

CARBOLOY
DEPARTMENT OF GENERAL ELECTRIC COMPANY

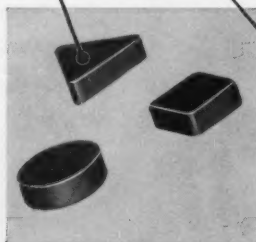
Carboloy announces THE FIRST SIMPLE-TO-USE



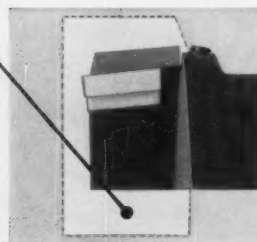
Clamp has built-in, wear-resistant carbide chip-breaker. Requires only light finger pressure to tighten; assures uniform chips, regardless of cut.



Indexable carbide pad is screwed to shank. Stays put while blank is indexed. Absorbs shock; decreases the possibility of holder damage.



Holders available for round, square, or triangular inserts. Expanded line of precision and utility blanks handle any machining job.



Unique design eliminates "club" below shank; reduces overhang to absolute minimum. Indexing is fastest, simplest ever, cuts changing time.

TOOLHOLDERS

- Single adjustment screw indexes throwaway insert, sets chipbreaker . . . right in the machine
- Entirely new design reduces overhang, prevents chip interference, provides greater rigidity
- Carbide pad protects shank by absorbing shocks
- Heat-treated shank resists bending, deformation

Unique clamping arrangement means you can index the blank, or turn it over — right in the machine — by simply adjusting a single screw at the top of the shank. The carbide chipbreaker is automatically set in the correct position.

Carbide pad cuts insert costs

The carbide pad allows more effective use of thin — and more economical — blanks. It gives greater rigidity; lets you use a harder grade of carbide, at greater speeds and feeds, to increase machine output at no extra cost.

Unique Carboloy holder design has no projection below the shank, keeping overhang at a minimum and providing greater rigidity and accuracy. Minimum projection

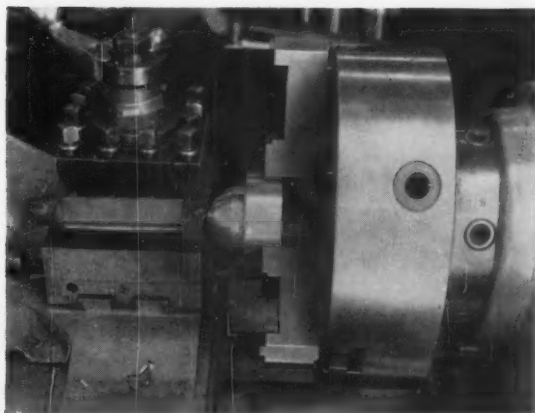
above the shank prevents chip interference and minimizes danger to clamp from flying chips.

Heat-treated shank gives the holder extra strength to resist deformation from clamp screw, and wear from chips.

Versatile holder design

The holder is quickly adaptable to "specials" with cutting angles other than standard, to positive or neutral rakes. Also, it is especially adaptable for gang tooling.

The new holder is stocked in seven styles and 52 sizes — paralleling the styles and sizes of Carboloy braze-type tools. For complete details on these easy-to-use toolholders, send coupon on page 8 of this advertisement, today.



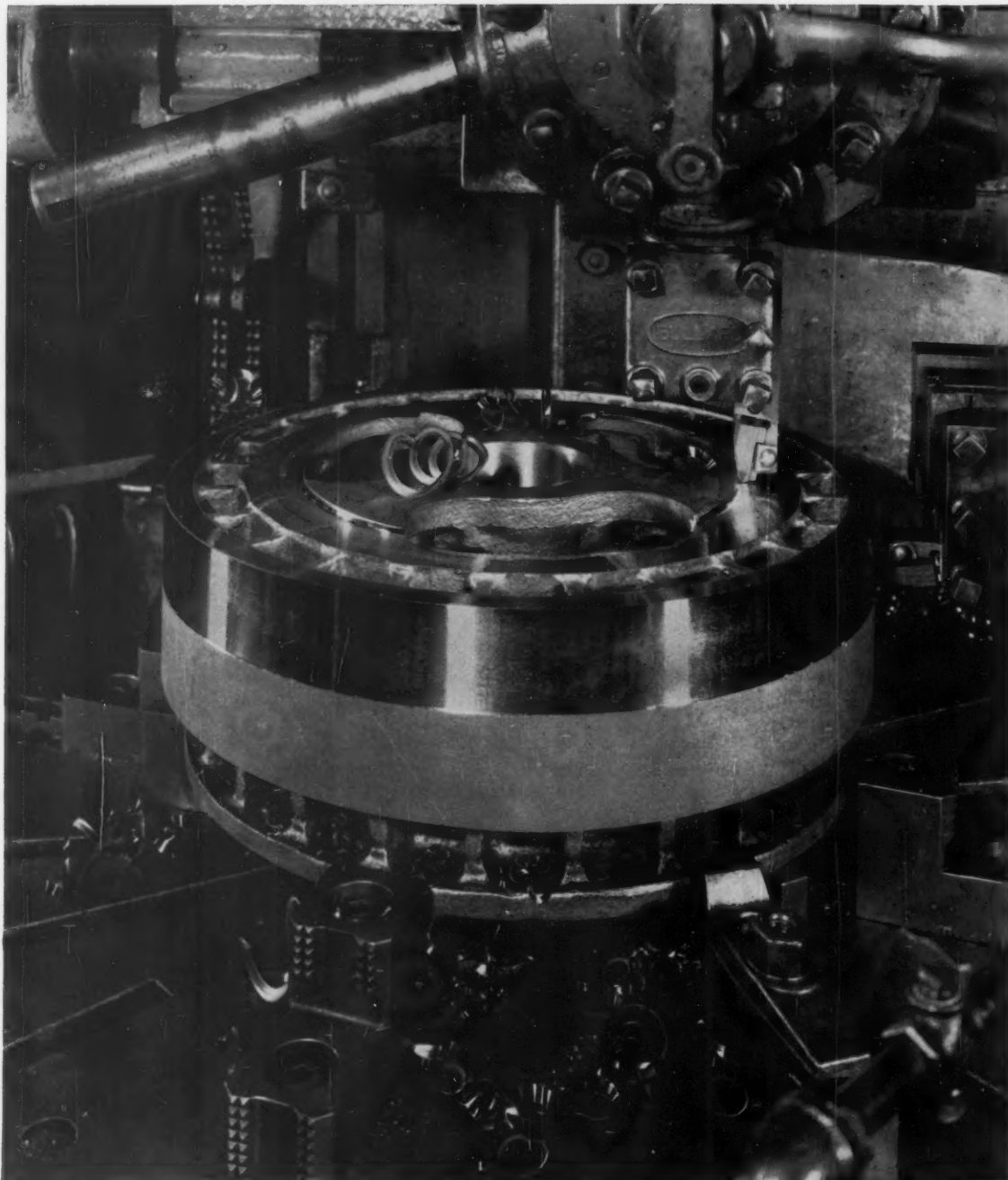
CONTOURING STELLITE VALVE. Round Carboloy insert is furnished precision-ground, eliminating costly grinding operation required for braze-type tools. Inserts on new Carboloy toolholder are indexed or turned over, right in the machine, reducing downtime. With Carboloy holders, only inserts are stocked, saving valuable toolroom space.

See Carboloy Carbide-Pad Toolholders
at the
Carboloy Exhibits of Metalworking Progress

National Machine Tool Builders Show
and
Production Engineering Show
Chicago — September 6-16

CARBOLOY
DEPARTMENT OF GENERAL ELECTRIC COMPANY

GRADES 350,370 INCREASE



FACING POWER-SHOVEL CLUTCH AND BRAKE DRUM. It took as many as 16 of the former carbide tools, on a 42-inch Bullard, to make a *single* cut through multiple sand inclusions and heavy interruptions. But a switch to Carboloy Grade 370 cut over-all machining costs almost 70%. A Grade 370 tool took *nine* cuts without any appreciable wear, reducing downtime costs from \$60 to \$1, and grinding costs from \$30 to nothing. Result: Greatly increased output from this machine. **SETUP:** Material — 1045 low carbon, high manganese cast steel, with hardness of 27R_c. **Speed** — 24 RPM. **Feed** — 0.018-0.033 inch. **Depth of cut** — $\frac{3}{8}$ inch. **Coolant** — No.

MACHINE TOOL OUTPUT

- Series 300 carbides continue to set performance records
- New Carboloy toolholders and expanded insert line increase opportunities for more new applications

In plant after plant, the combination of the proper machine tool and performance-proved Carboloy Grades 350 and 370 is setting production records. The case history on the opposite page is just one of hundreds which have been recorded.

Range of use extended

Versatile Grades 350 and 370 cover steel-cutting from medium finishing to heavy-

duty roughing. Now, with the expanded line of Carboloy inserts and new toolholders, these grades can be applied to *any* application. In-plant production records have been set on turning, boring, milling, facing, planing, and other machining jobs.

Contact your local Authorized Carboloy Distributor for off-the-shelf tools and blanks, or send coupon on next page for price list and catalog.

MANY NEW MACHINES AT THE NMTBA SHOW WILL BE RUNNING WITH CARBOLOY CEMENTED CARBIDES

Builders of these machines include:

| COMPANY | BOOTH NO. | COMPANY | BOOTH NO. |
|---|-----------|---|-----------|
| American Steel Foundries | | The G. A. Gray Co. | 1120 |
| King Machine Tool Division | 1121 | Jones & Lamson Machine Co. | 1111 |
| Axelson Manufacturing Company | | Kearney & Trecker Corporation | 508 |
| Division of U.S. Industries, Inc. | 519 | The Lapointe Machine Tool Company | 707 |
| Barber-Colman Company | | The R. K. LeBlond Machine Tool Company..... | 1313 |
| Hendey Machine Division | 221 | Lipe-Rollway Corporation | 803 |
| Brown & Sharpe Mfg. Company | 520 | The Lodge & Shipley Company | 502 |
| Bryant Chucking Grinder Co. | 1015 | The Monarch Machine Tool Company | 920 |
| The Bullard Company | 1213 | The National Acme Company | 324 & 705 |
| Cincinnati Lathe & Tool Co. | 309 | The New Britain Machine Company | 1419 |
| The Cleveland Automatic Machine Co. | 412 | The Ohio Machine Tool Co. | 301 |
| The Cleveland Grinding Machine Co. | 810 | Pratt & Whitney | |
| Cone Automatic Machine Company, Inc. | 401 | Division Niles-Bement-Pond Company..... | 1219 |
| The Cross Company | 1118 | Rockford Machine Tool Company | 1423 |
| DeVlieg Machine Co. | 1317 | The Sheffield Corporation | 1305 |
| Ex-Cell-O Corporation | 1319 | The Sidney Machine Tool Company | 1116 |
| Geometric Tool Company Division | | The Springfield Machine Tool Co. | 612 |
| Greenfield Tap and Die Corporation | 223 | Sundstrand Machine Tool Co. | 1412 |
| Giddings & Lewis Machine Tool Co. | 710 | Van Norman Company | 905 |
| Gisholt Machine Company | 1413 | The Warner & Swasey Co. | 717 |

See Carboloy Cemented Carbides in Action

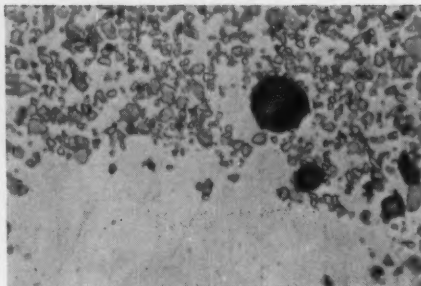
CARBOLOY
DEPARTMENT OF GENERAL ELECTRIC COMPANY

Carboloy announces

CARBIDE SURFACING

Now in field appraisal, coatings of tungsten carbide bonded to vital surfaces of machine and product parts to combat wear. These surfaces have wear-resistant properties similar to solid cemented carbides. Where it is impractical to use a solid carbide blank, this process can be applied. (Not commercially available.)

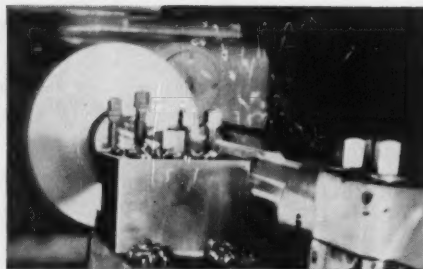
Photomicrograph of surfaced cross-section, showing metallurgical bond and distribution of carbide particles (500X).



CEMENTED OXIDE TOOLS

Now in laboratory appraisal, cemented oxide cutting tools for precision finishing of steel at speeds up to 2500 FPM. Extremely hard, the new oxide tools are made entirely of non-strategic materials. They will be operating on several jobs at the NMBTA Show. (Not commercially available.)

Cemented oxide tool cutting at 2000 FPM on 125-HP lathe at Carboloy's Machinability Lab. (Feed: 0.005 inch. Depth of cut: 0.100 inch.)



See these new developments at the Carboloy Exhibits of Metalworking Progress
National Machine Tool Builders Show and Production Engineering Show
Chicago — September 6-16

"Carboloy" is the trademark for products of the Carboloy Department of General Electric Company

CARBOLOY

DEPARTMENT OF GENERAL ELECTRIC COMPANY
11147 E. 8 Mile Blvd., Detroit 32, Michigan

Send me information on the following
Carboloy products:

- ☐ Carboloy Machinability Computer
- ☐ First Easy-To-Use Toolholders
- ☐ Expanded line of insert blanks
- ☐ Grades 350 and 370 steel-cutting carbides
- ☐ Put me on the list to get data on carbide surfacing, when available

Name _____

Position _____

Company _____

Address _____

City _____ Zone _____ State _____

CARBOLOY CREATED-METALS FOR INDUSTRIAL PROGRESS



right in tune
...and REX is the standard
by which all other high speed
steels are compared

A tuning fork sounds the *standard pitch* to which musical instruments are compared. There's a recognized standard for high speed steels, too — Crucible REX®.

But don't take our word for it. Try REX in your own shop. Compare its structure, finish, hardenability, carbide distribution and general uniformity. Measure the *extra performance* you get. You'll see for yourself why no other tool steel outperforms REX . . . why it's the *standard for comparison* wherever high speed steels are used.

Next time you buy tool steels, be sure of top performance — specify REX. Remember, it's made only by Crucible — and is available from local warehouse stocks, or by prompt mill delivery. *Crucible Steel Company of America, Henry W. Oliver Building, Pittsburgh 22, Pa.*

Visit us at Booths 830-832 Production Engineering Show, September 6-16, Navy Pier, Chicago.

CRUCIBLE

first name in special purpose steels

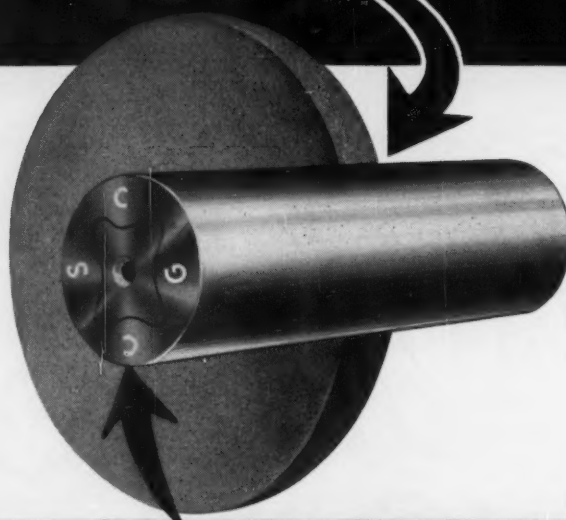
Crucible Steel Company of America

For more information on products advertised, use Inquiry Card, page 325

MACHINERY, September, 1955—125

An exclusive GRINDING PROCESS...

makes
**CUMBERLAND
STEEL BARS**
concentric, straight,
smooth & really accurate



BE SURE OF THIS MARK ON THE END OF YOUR SHAFTS

CUMBERLAND GROUND BARS FOR ALL TYPES OF MACHINES

They are carefully ground to our standard manufacturing tolerance, plus nothing to minus .002" on diameters 1-1/8" to 2-7/16" inclusive . . . plus nothing to minus .003" on diameters 2-1/2" to 8" inclusive. Closer tolerance can be furnished, if desired. And, remember, Cumberland Steel Bars are the end result of 109 years' experience,—and every bar is *carefully tested* before shipment. The list of Cumberland's customers reads like the "Blue Book" of Industry. Ask for further information.

MANUFACTURED IN THREE SPECIFICATIONS

Cumberland Brand—AISI C-1020/C-1025, Elastic Limit 30,000# Min.

Potomac Brand—AISI C-1040, Elastic Limit 45,000# Min.

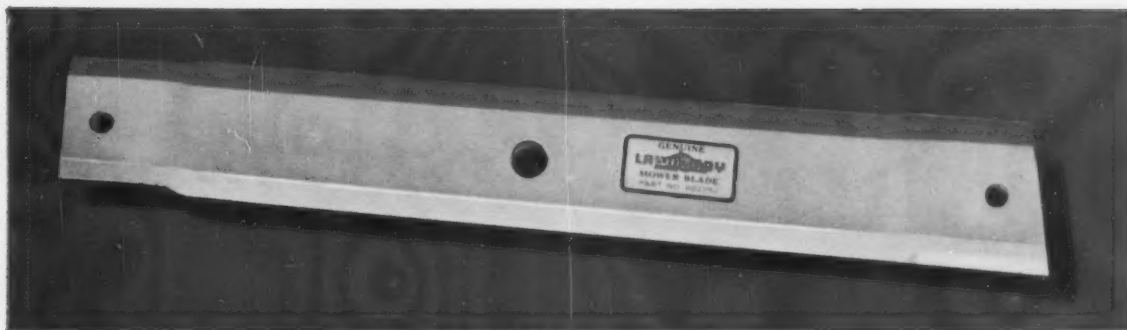
Cumsco Brand—AISI C-1141, Elastic Limit 57,000# Min.

CUMBERLAND STEEL COMPANY

CUMBERLAND, MARYLAND, U.S.A.

ESTABLISHED 1845

INCORPORATED 1892



Cutter blade of Crucible alloy steel.



First step in manufacture of cutter blade. Crucible beveled blade alloy steel is fed through this 100-ton press, where it is cut to length and holes punched.



Next, lengths are formed to shape on a hydraulic press, and then given a tempering bath as shown.

CRUCIBLE ALLOY STEEL *cuts blade damage in rotary mowers...*



Lawn-Boy mower.
Built by RPM
Manufacturing Co.,
Lamar, Mo., a
subsidiary of
Outboard, Marine &
Manufacturing
Company, maker of
Johnson & Evinrude
outboard motors.

Rotary lawnmower cutter blades, whirling at high speeds, often hit small rocks or bits of trash. Ordinary steels just can't take that sort of rugged treatment. They chip, crack — wear out far too quickly. That's why in leading mowers, like the new *Lawn-Boy*, you'll find special *alloy steel* cutter blades designed for reliable performance.

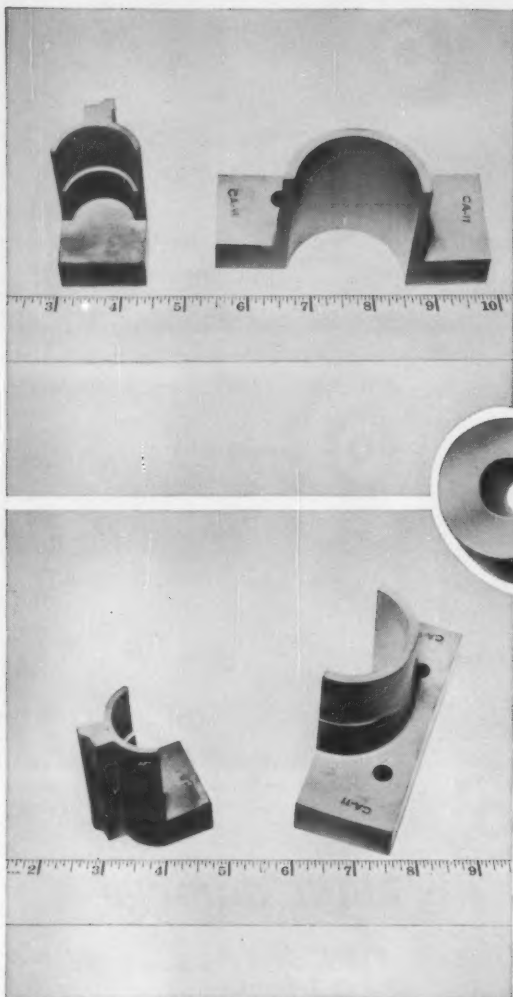
For Crucible has developed a *special alloy steel* made to give the best possible combination of toughness and hardness for long-lasting edges—and formability and ductility for ease of manufacture. It's been so successful that *Crucible* is now the largest producer of lawnmower steels.

Most Crucible steels are designed to fill *special* needs. If you have an application where ordinary steels won't do, come to Crucible. Take advantage, too, of the dozens of technical booklets and data sheets Crucible has prepared to help you make the best use of special steels. For a free publication catalog, write *Crucible Steel Company of America*, Henry W. Oliver Building, Pittsburgh 22, Pa.

CRUCIBLE

first name in special purpose steels

Crucible Steel Company of America



Look How You Can
Save with
PREFORMED

CARMET[®]

DIE SECTIONS

these Blanks are preformed
to a Finishing Allowance
of .018"-.022" per side



Write for Your Copy:
CARMET CATALOG

Just out . . . 32 well-illustrated pages, containing data on all Carmet grades, and on Carmet blanks, tools, die sections, punches, draw die inserts, etc.; also special preforming to order.
● Write for your copy.

ADDRESS DEPT. M-69

These tungsten carbide die sections are of Carmet CA-11, a special grade developed expressly for punches, dies, and other heavy shock applications where wear and abrasion resistance are required.

These blanks have a span of 1.315" with a wall thickness of only .046", but they were easily produced to close tolerances by AL's precision preform methods. All surfaces are clean, smooth and free from defects, requiring only a minimum amount of grinding to final dimensions.

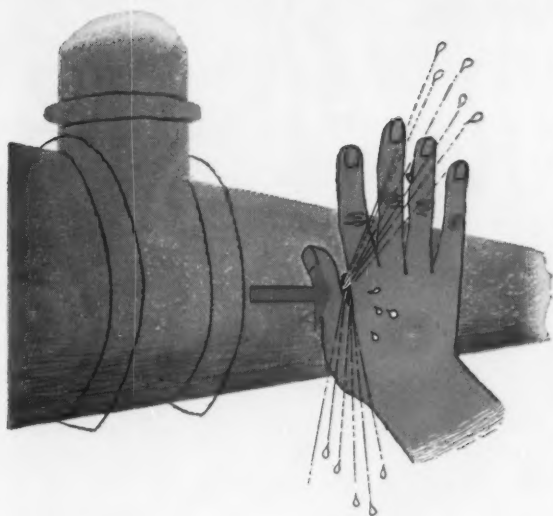
Carmet carbides can be accurately produced to practically any shape or size your designs may require, and can be supplied preformed as desired. Typical highly successful applications include inserts for drawing, heading, extruding and blanking dies; gauge and wear parts; pins; bushings; etc.

Find out, TODAY, how you can cut costs with preformed Carmet. Write or call *Allegheny Ludlum Steel Corporation, Carmet Division, Wanda and Jarvis Avenues, Detroit 20, Mich.*

For ALL your CARBIDE needs, call
Allegheny Ludlum

WAD 5390





a hole here means trouble...



a hole here saves trouble

Visit us at Booths 830-832 Production Engineering Show, September 6-16, Navy Pier, Chicago.

Crucible Hollow Tool Steel Bars are a great trouble-saver for the metalworking industry. For they eliminate costly, time-consuming drilling, boring, cutting-off or rough-facing operations. And you save production time, machine capacity, and avoid scrap losses . . . for the hole is already in the steel you buy.

Crucible Hollow Tool Steel Bars are now available in any of our famous tool steel grades . . . in almost any combination of O.D. and I.D. sizes. And you get *immediate* delivery of five popular grades — KETOS oil-hardening, SANDERSON water-hardening, AIRDI 150 high-carbon high-chromium, AIRKOOL air-hardening, and NUDIE V hot-work tool steels.

Let your Crucible representative show you how these easy-to-use Crucible Hollow Tool Steel Bars can save you time and money. *Crucible Steel Company of America, Henry W. Oliver Building, Pittsburgh 30, Pa.*

CRUCIBLE

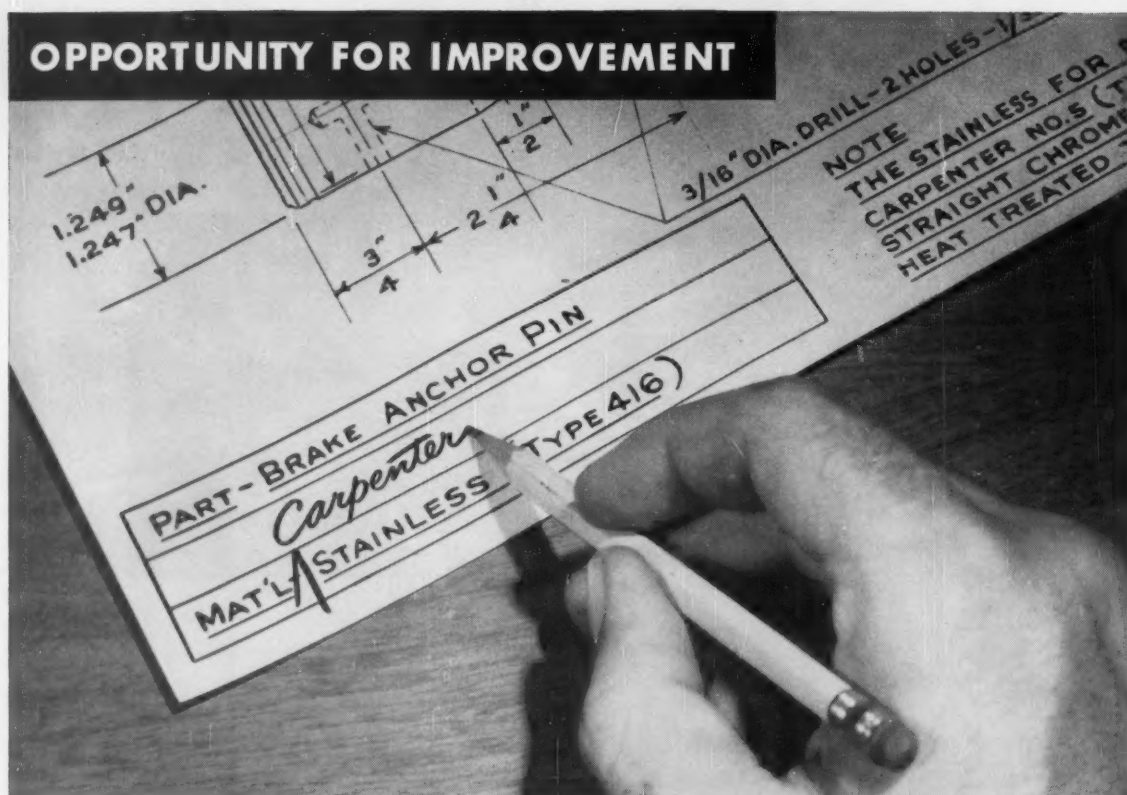
first name in special purpose steels

Crucible Steel Company of America

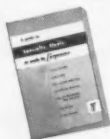
For more information on products advertised, use Inquiry Card, page 325

MACHINERY, September, 1955—129

OPPORTUNITY FOR IMPROVEMENT



one move... can open new horizons for you!



DO YOU HAVE THIS BOOK?

It is designed to give you a quick summary of the products Carpenter supplies to industry. Because of the high standards to which these steels are made, you may find new ways to cut costs, increase production or improve your own products.

For your copy, contact your Carpenter representative, or drop us a line on your company letterhead. No obligation, of course.



Ever since Carpenter developed the first **free-machining stainless**, industry has applied Carpenter Stainless in its search for new opportunities for improvement.

One example is a new freedom from corrosion problems... made possible by the development of **Carpenter No. 20**, a hot sulphuric acid resisting stainless steel. Another is the economical, mass-production of severely cold headed chrome-nickel parts with Carpenter-pioneered **Stainless No. 10**.

Still another is found in industry's

search for more dependable steels to meet the demands of high temperature applications. In this field of **super alloys**, too, Carpenter is producing **heat resisting alloys** to established standards of Carpenter quality.

And consider this: Carpenter quality is safeguarded by one of the largest staffs of skilled metallurgists, per pound of steel produced, in the industry. Discover how you can explore new horizons of product and production improvements **today**... by moving to Carpenter.

Carpenter STEEL

Corrosion and Heat Resisting Steels

IMMEDIATE DELIVERY from local warehouse stocks
THE CARPENTER STEEL CO., 105 W. Bern St., Reading, Pa.
Export Department: The Carpenter Steel Co., Port Washington, N.Y.—"CARSTEELCO"



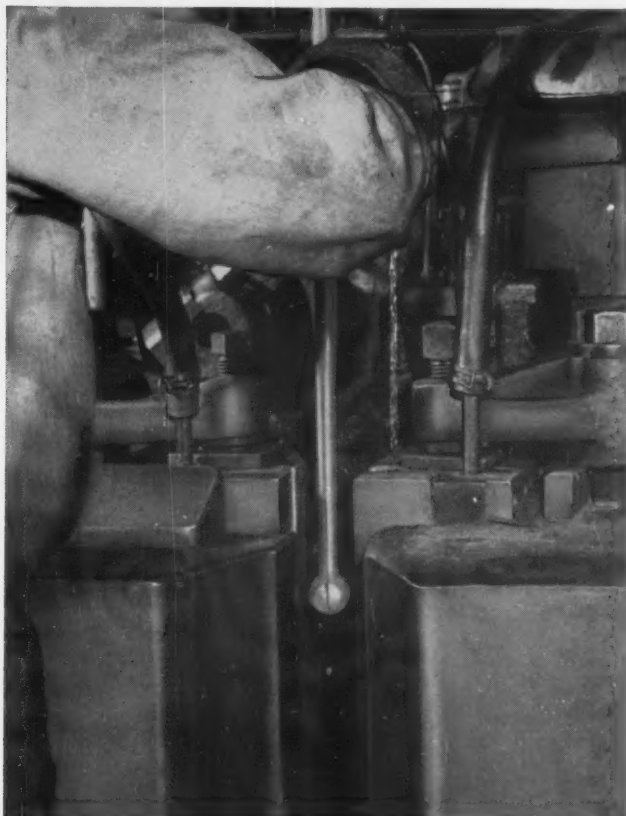
Tool Steel Topics



On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

Export Distributors: Bethlehem Steel Export Corporation



Forging Die of Cr-Mo-W Produces 2000 Steering Links Daily

This is the business end of a hot forging die, used in a West Coast plant to produce socket forgings for automobile steering-linkage assemblies. A typical steering link is shown after the first blow in the multiple-station die, made of Bethlehem Cr-Mo-W (chrome-moly-tungsten) tool steel.

The Cr-Mo-W die, hardened to Rockwell C 52-56, shapes hot-rolled 23/32-in. rounds of 1030 steel at the rate of 300 pieces per hour, producing approximately 30,000 pieces before reworking is required. It is then machined and re-treated, resulting in long service life.

Bethlehem Cr-Mo-W is a general-purpose hot-work tool steel, with a 5 pct chromium content, plus moly and tungsten. It is ideal for jobs involving shock or radical changes of temperature. It hardens in air for exceptional resistance to distortion during heat-treatment. It has good red-hardness, which provides resistance to heat-checking. Cr-Mo-W also machines easily, as it can be annealed to 217 Brinell.

Cr-Mo-W is used extensively for applications such as trimmer dies, die-casting dies, hot-shear blades, and various types of punches. Why not look into this fine tool steel? Your nearest Bethlehem tool-steel distributor will be pleased to furnish full information. He can offer good delivery, too.



BETHLEHEM TOOL STEEL ENGINEER SAYS:

How to Machine Heat-Treated Tools

Machining hot-work tools and plastic and die-casting molds directly from bar stock heat-treated to Rockwell C 30-45 presents many a problem.

Carbide tools are preferred, though they require careful handling. Due to the high hardness of the metal being cut, much heat is generated during machining, causing the carbide tools to wear rapidly. To cut pre-hardened tool steels in turning, boring, planing and milling operations, use speeds of from 60 to 120 surface ft per min.

High-speed steels can be used in such operations with cutting speeds of 15-25 surface ft per min, though tool life will be short. Conventional drills of high-speed steel are satisfactory if the cutting speed is slowed. Conventional tapping of threads rarely succeeds, single-point lathe tools being used instead.

The advantages of pre-hardened tool-steel stock — the elimination of heat-treatment on the machined tool, and the exact control maintained over tool dimensions — must be weighed against the difficulties encountered in machining, which have frequently been considered insurmountable.



Omega Chisels Bite Deep, Stay Sharp

Because Bethlehem Omega has a normal working hardness at the cutting edge of Rockwell C 58-60, chisels made of this fine tool steel hold their sharp edge. Omega combines shock-resistance with hardness and ductility. It is easy to forge, redress, and heat-treat, and can be hardened in oil or water.

Here's the best shortcut in the field of organic finishing

One operation usually removes paint, rust and oil at the same time.

One tank of Oakite Rustripper frequently does all these jobs:
(1) strip rejects and conveyor hooks; (2) pickle rusted stock; (3) prepare reconditioned products for refinishing operations.

One tank may eliminate many tanks used in ordinary cycles.

**OAKITE
RUSTRIPPER**

RINSE

PREPAINT

DRY

PAINT

Here's the
best shortcut
in the field of
organic
finishing

OAKITE PRODUCTS, INC.

FREE Our illustrated booklet tells how this amazing cleaner - stripper - deruster offers tremendous possibilities for saving minutes, hours, dimes, dollars. Write or send coupon for your copy.

Here's the best shortcut in the field of electroplating

One operation usually removes rust and oil at the same time. One alkaline tank may remove oxides, drawing compound residues and other stubborn soils ... even strip zinc and cadmium from rejects and racks.

Sensational Oakite Rustripper frequently eliminates acid pickling and its troublesome after-effects: (1) hydrogen embrittlement; and (2) smut that must be removed by electrocleaning or hand brushing.

**OAKITE
RUSTRIPPER**

RINSE

ELECTROPLATE RINSE CYANIDE or ACID DIP

Here's the
best shortcut
in the field of
electroplating

OAKITE PRODUCTS, INC.

FREE Our illustrated booklet tells how this shortcut may save you time and money—in tank lines, in automatic platers, in barrel lines—by saving equipment, floor space, acids, water, steam and electricity. Write or send coupon for your copy.

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Send me a free copy of the booklet checked:

- ☐ "Here's the best shortcut in the field of organic finishing"
☐ "Here's the best shortcut in the field of electroplating"

NAME _____

COMPANY _____

ADDRESS _____

At The Production Engineering Show
Visit Oakite Booth No: 652



**NEWEST BASIC MACHINE TOOL
FOR PRODUCTION LINE WORK...**

**... Up to 50% or More Cost Reduction
on Hundreds of Machining Operations!**

The DoALL Band Machine is the latest of the basic machine tools—originated in 1933. At first used primarily for tool and die work, it has now been developed into the most versatile production line machine tool in the world. Hydraulic power feed tables, infinitely variable speeds, integral coolant systems, new DoALL Demon High Speed Steel Blades and many other features enable new DoALL Band Machines to achieve great cost reductions on hundreds of operations formerly performed on other machine tools. Time savings up to 150% or more can be expected on such operations as: common slotting; splitting; notching; trimming; contour cutting; cutting grinding reliefs, and many others.

The following pages explain the remarkable versatility and economy of this new machining concept.

DoALL

The DoALL Company
Des Plaines, Illinois

Please turn the page for details. —————>

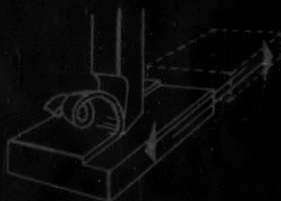
How the Versatility of the

WITH OTHER MACHINE TOOLS . . .



In milling or surface grinding, cuts are made in one direction

OR . . .



In planing or shaping, cuts are made in one direction

OR . . .



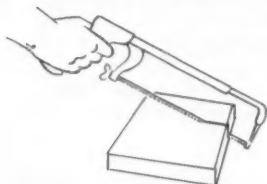
On the lathe, cuts are made on surfaces of rotating workpiece



Look . . . What Band Machining Can Do!

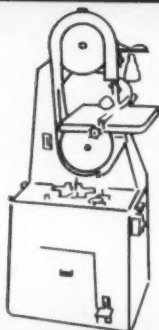
Complete Remote Control on World's Largest Band Machine. The tremendous capabilities of the band machine are clearly shown in the picture at the left. It's the world's largest band machine — used by Alcoa at Lafayette, Indiana, to make accurate internal cuts in extrusion dies up to 36" diameter by 30" depth! Three synchronized remotely controlled power tables guide the work in any desired direction into the continuous-cutting band tool. The operator follows the layout line by periscope from his control station.

FIRST . . . The hacksaw.

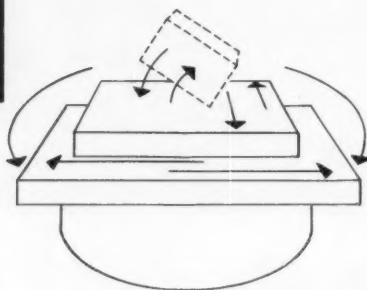


THEN . . .

The DoALL metal cutting band saw.



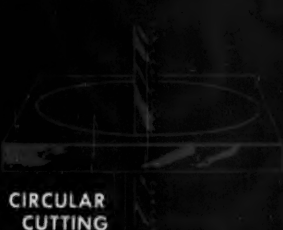
NOW . . . A complete remote control power feed machine tool using a continuous band cutting tool.



All this in just 22 years . . . fastest basic machine tool development in history . . . and the most versatile machine tool ever developed.

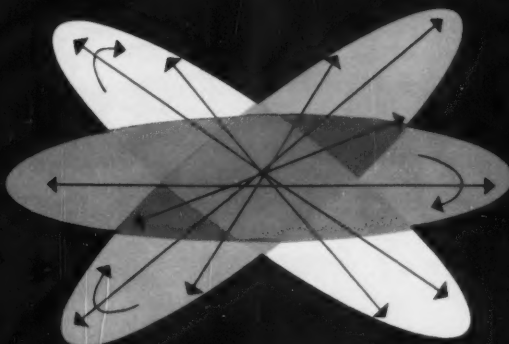
Band Machine Reduces Costs

BUT WITH A DOALL BAND MACHINE . . .



CIRCULAR CUTTING

Straight or contour cuts of any length can be made in any direction and at any angle.



IRREGULAR CONTOURS



COMPOUND ANGLES

Why You Can Produce More— faster and at lower cost with a DoALL band machine

Plants that have applied band machining to production machining have experienced cost reductions ranging from 10% to 90% as compared to the costs on other machine tools. Here are some of the reasons for these remarkable savings:

CUTS FASTER! Because it is thin, has many teeth (1500 or more) cuts continuously and runs at relatively high velocities, the band tool penetrates material faster. Cutting only a narrow slot, the tool "slices" through work, removes an entire section of metal intact instead of slowly nibbling it down into a pile of chips. (*Friction sawing speeds range up to 15,000 blade feet per minute!*)

LOW COST TOOLS! DoALL Band Tools, especially the amazing Demon High-Speed Steel Band, will machine up to 10,000 square inches of mild steel at 10 square inches per minute. In terms of work output per hour, no other cutting tool can compare!

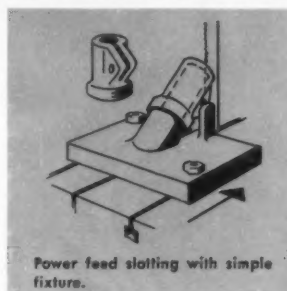
FIXTURING IS SIMPLER! Cutting force is in the direction of the table. Back-up bars or other simple, low cost fixtures are all that are required to hold work in position as the power feed table carries it into the blade for straight cuts. Fixtures often cost but $\frac{1}{10}$ to $\frac{1}{2}$ of those for other machine tools. Many can be improvised in a short time.

LESS SET-UP TIME! The simple fixturing permits the operator to set-up his work in a fraction of the time often required on other machines.

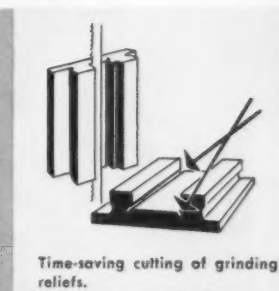
DOES MORE JOBS! The versatility of the band machine increases its usefulness, keeps it on the go, increases return on investment.

SAVES MATERIAL! In many cases, the sections of costly material saved by band machining can be salvaged for other uses.

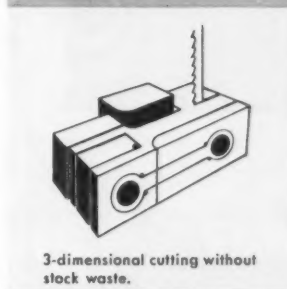
COSTS LESS! A new power-feed DoALL Band Machine often costs but $\frac{1}{3}$ to $\frac{1}{2}$ as much as other machine tools previously used for many of the same machining operations.



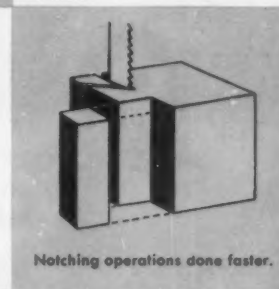
Power feed slotting with simple fixture.



Time-saving cutting of grinding reliefs.



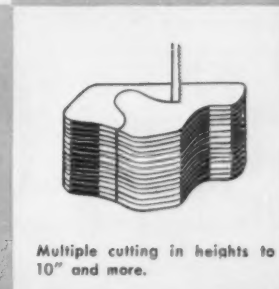
3-dimensional cutting without stock waste.



Notching operations done faster.



Mass production splitting operation.



Multiple cutting in heights to 10" and more.

PROOF . . . FACTS . . . FIGURES

. . . see the next page →

Look At These Savings!

SAVES 33 HOURS and \$190 TOOL COST—Slots band machined in 1½ ton #4140 forging in 3 hours at a tool cost of \$10 per piece. Formerly cut on \$25,000 slotter in 36 hours at a tool cost of \$200 per piece.

66% SAVING—Rapid trimming with excellent finish by band machining results in 66% saving over former milling operation.

15 TIMES FASTER—Bearings split in 40 seconds on band machine using simple 180° indexing fixture. Former milling time was 10 minutes each.

SECTION REMOVED WHOLE IN 7.8 MINUTES—Steel forging SAE 4340. Nature of task excludes all methods but band machining for speed and efficiency.

FAST ANGLE CUT — NO FIXTURING COST 45 degree cut made on band machine in .25 minutes using simple vise as fixture.

96% SAVING—High temperature fan nickel-chrome steel blades are trimmed to length on over mill. Only a simple index fixture required.

SEE A DEMONSTRATION —

You can see this new machining method without obligation at your own plant. Call your local DoALL Store, or write: The DoALL Company, Des Plaines, Ill.



SEE NEW FILMS—two new sound color films available for group showings:

1. "Production Band Machining"—30 minutes.
2. "Production Tooling"—10 minutes.

... revealing the newest concept for cost-reductions in machining. Call your local DoALL Store or write, The DoALL Company, Des Plaines, Illinois.

DoALL



Friendly DoAll Stores . . . (in 37 cities)

Personalized Service . . . Complete Stocks . . . Local Delivery



EDUCATIONAL STUDY WALL CHARTS

Economic Principles
\$1.00 each postpaid
Lower quantity prices

See how you can

Smoke out the Bugs

from your surface grinding operations



ABRASIVE will be at the Machine Tool Show with revolutionary new machinery,

features, methods, ideas! Bring your problem "bugs" . . .

Abrasive will show you how to grind answers that will "smoke 'em out."



ABRASIVE MACHINE TOOL COMPANY
Dexter Road • East Providence, Rhode Island

Compare

...AND YOU'LL SEE WHY

Increased Production Costs Less
with DANLY PRESSES

Feature for feature, *you* can compare Danly presses with all others and see why far-sighted, progressive management prefers Danly. Such point-by-point, feature-for-feature comparison is exactly what one of the world's largest builders of autos and trucks made. Result? They bought and installed Danly Presses in their new production lines.

Now, after more than two years of continuous, high-speed production, these presses have "proved out" with a truly outstanding performance record. First, they have been charged with *only four man days* for other than routine maintenance. During this same period, *shift production averages have been consistently higher* for long, continuous runs. The cost advantage and over-all output gain is obvious.

Other indirect benefits were noted, too. *Installation* of all the presses was completed without overhaul or major adjustment. Also, the dependability of the Danly Presses made it unnecessary to maintain costly stocks of press spare parts — an important cost saving in itself.

Danly Presses will "prove out" in your plant the same way. Use the check list shown now . . . make your own comparison and see why Danly Presses will give you increased production at lower cost.

It costs less to run a DANLY PRESS

DANLY MACHINE SPECIALTIES, INC.
2100 South Laramie Avenue • Chicago 50, Illinois

DANLY

USE THIS CHECK LIST

... Compare Danly Presses, feature for feature, with any other press on the market. See Danly Presses in action at the Machine Tool Show.



| COMPARE | | FEATURE | |
|--------------------|--|---------|-------|
| INSTALLATION COSTS | | DANLY | OTHER |
| DRIVE | | ✓ | |
| CONSTRUCTION | | ✓ | |
| LUBRICATION | | ✓ | |
| MAINTENANCE | | ✓ | |
| CONTROLS | | ✓ | |

Danly presses are delivered already "run-in" tested. Faster installation is assured by assembly and operation in the Danly plant.

Danly's cool-running clutch lasts up to 7 times longer. Herringbone type gears and anti-friction bearings on high speed shafts wear longer.

Danly presses are made entirely of heavy stress-relieved steel weldments. Extra heavy internal ribbing decreases deflection.

Danly features completely automatic oil lubrication. When any vital area is not being sufficiently lubricated, safety switch stops press.

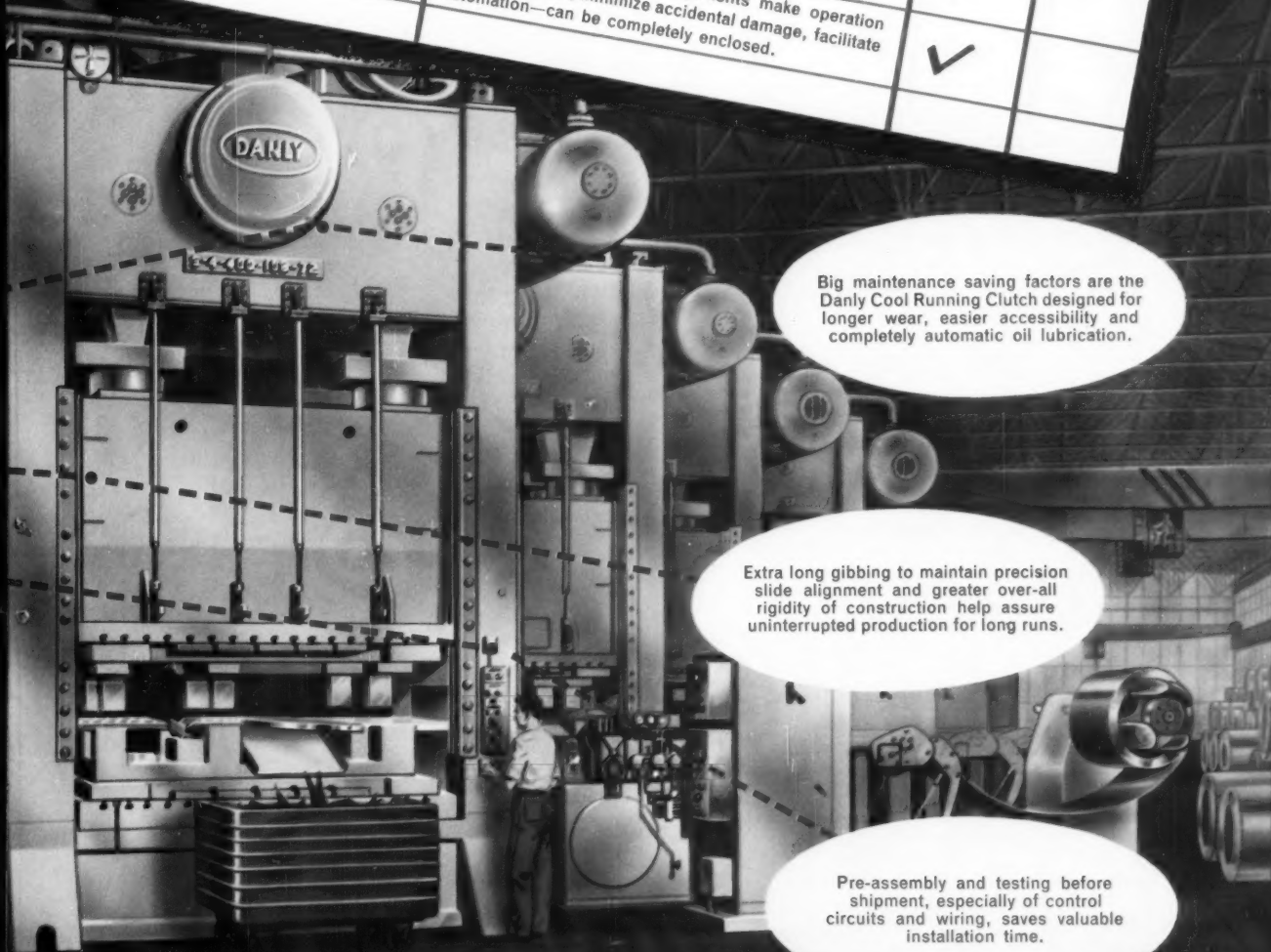
Performance records in the country's biggest stamping shops prove that Danly Presses require less maintenance, greatly reduce spare part needs.

Special Danly Control arrangements make operation easier and safer, minimize accidental damage, facilitate automation—can be completely enclosed.

Big maintenance saving factors are the Danly Cool Running Clutch designed for longer wear, easier accessibility and completely automatic oil lubrication.

Extra long gibbing to maintain precision slide alignment and greater over-all rigidity of construction help assure uninterrupted production for long runs.

Pre-assembly and testing before shipment, especially of control circuits and wiring, saves valuable installation time.





Holes, Contours, Surfaces

Published in the interests of greater accuracy and quality in the toolroom and on the production line by the Moore Special Tool Co., Inc., 7-2 Union Ave., Bridgeport 7, Conn., builders of Jig Boreers, Jig Grinders, Panto-Crush Wheel Dressers, Precision Rotary Tables, Motorized Centers and a complete line of Hole Location Accessories.

7 Tricks of the Trade in Jig Grinding Small Holes

The following tricks of the trade will prove helpful in jig grinding small holes with a diamond-charged mandrel:

1. Uniformly graded diamond powder should be used for charging mandrels. Holes from minimum ($1/64''$) to about $3/32''$ in diameter should be roughed and finished with 80-100 grit powder. Larger holes may be roughed somewhat more rapidly with a coarser grade, 60-80 grit.
2. Avoid bellmouth by preventing the mandrel from leaving the hole at either end.
3. Since a freshly charged mandrel will cut much more rapidly than a worn one, avoid introducing a freshly charged tool as a hole nears size, Fig. 1.
4. Do not permit the uncharged *shank* of a mandrel to contact the surface being ground. Frictional heat will burn both the work and the mandrel. The former, partially annealed at point of such contact, will charge with diamond sut and probably be ruined.
5. It is generally more economical and efficient to consider mandrels as expendable and make a new one for each job. Since the cost is only a few cents, use of an old one, or even the time spent trying to match one to requirements, is hardly justified.
6. Because mandrels cannot be trued with a diamond, it is necessary to measure both the top and bottom of a hole

while grinding, in order to avoid a ridge.

7. In view of point 6, it is advisable to set the work up on parallels of sufficient height to enable measurement from beneath the workpiece, Fig. 2.

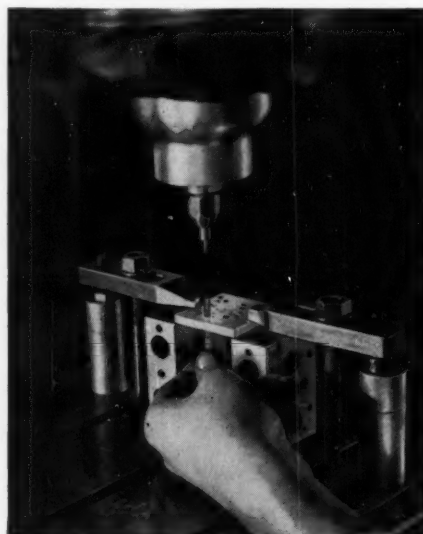


Fig. 2. Workpiece is mounted high enough to permit measuring bottom as well as top of hole.

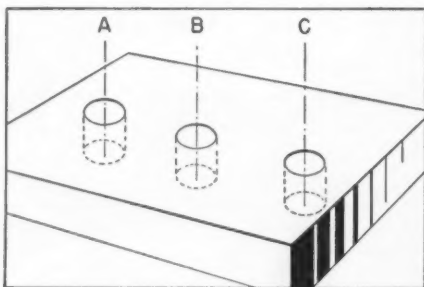


Fig. 1. In grinding three holes to size, A and B are roughed to within $.001''$ — $.002''$, and C within about $.005''$. Using a freshly charged mandrel, C is finished to size, thereby breaking down the high points on the tool. A and B may now be safely ground to size.

Get ALL the answers from this new, 424-page book

The information on this page is just a sample of the valuable, on-the-job aid you can get from Moore's all-new book, **HOLES, CONTOURS AND SURFACES**. Tells you how to produce tools, dies and precision parts the modern way.



424 pages, 495 illustrations. 184 pages of Woodworth Coordinate Location Tables from 3 to 100 holes. Price only \$5 in U.S.A., \$6 elsewhere. Send check or money order to Moore Special Tool Co., Inc., Union Ave., Bridgeport 7, Conn.



HEAVY MACHINE TOOLS...

TO MEET TODAY'S PRODUCTION DEMANDS

NILES 30'

Heavy Vertical Boring Mill

wholly mechanical or electronic operation,

including complete electronic

feeding. Swing sizes

of 100" and up.

Equipped with one

right-hand and one left-hand

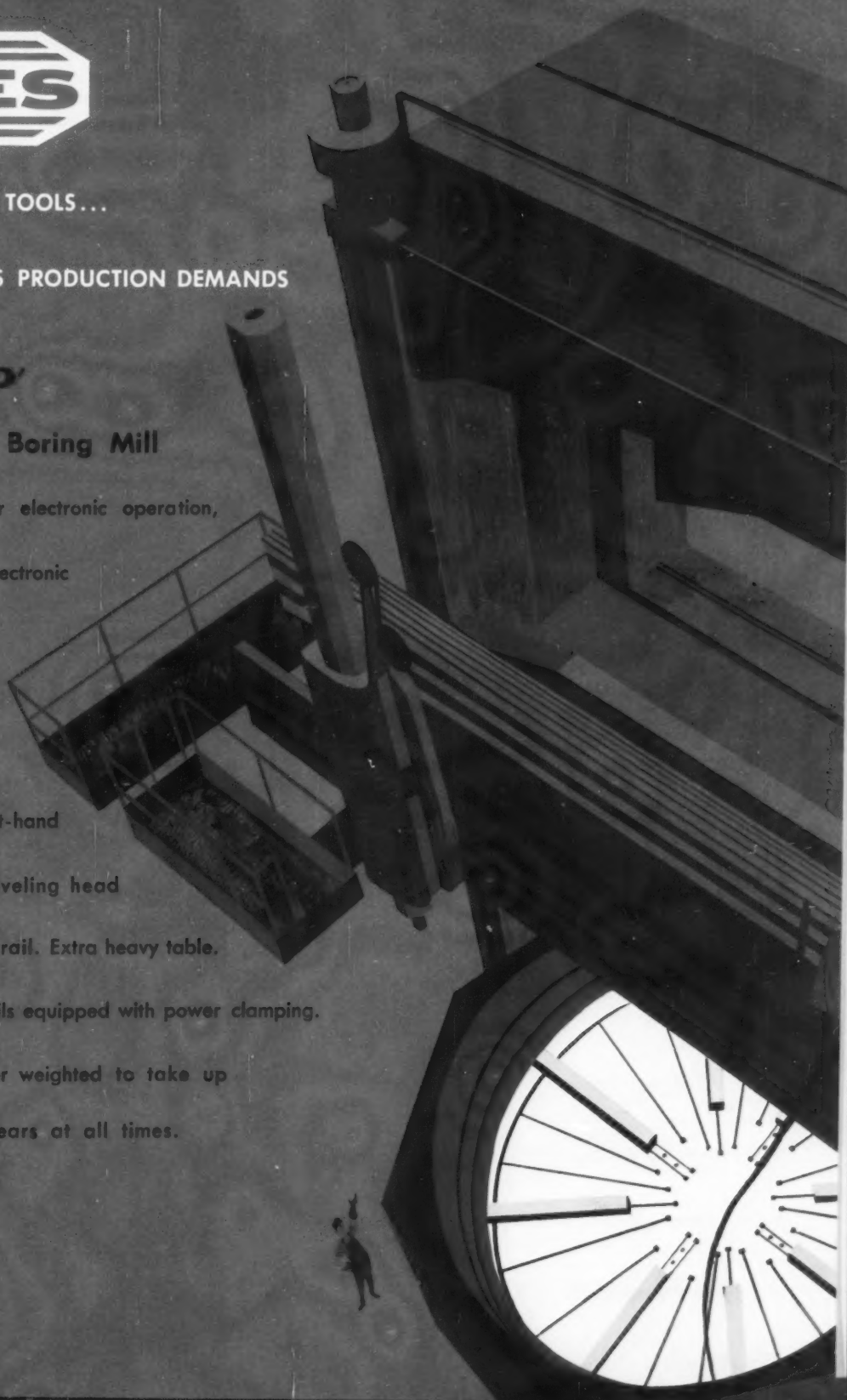
octagon-type bar swiveling head

installed on the crossrail. Extra heavy table.

Crossrail rams and rails equipped with power clamping.

Rams are over-counter weighted to take up

backlash in feed gears at all times.





Holes, Contours, Surfaces

Published in the interests of greater accuracy and quality in the toolroom and on the production line by the Moore Special Tool Co., Inc., 7-2 Union Ave., Bridgeport 7, Conn., builders of Jig Boreers, Jig Grinders, Panto-Crush Wheel Dressers, Precision Rotary Tables, Motorized Centers and a complete line of Hole Location Accessories.

7 Tricks of the Trade in Jig Grinding Small Holes

The following tricks of the trade will prove helpful in jig grinding small holes with a diamond-charged mandrel:

1. Uniformly graded diamond powder should be used for charging mandrels. Holes from minimum (1/64") to about 3/32" in diameter should be roughed and finished with 80-100 grit powder. Larger holes may be roughed somewhat more rapidly with a coarser grade, 60-80 grit.
2. Avoid bellmouth by preventing the mandrel from leaving the hole at either end.
3. Since a freshly charged mandrel will cut much more rapidly than a worn one, avoid introducing a freshly charged tool as a hole nears size, Fig. 1.
4. Do not permit the uncharged *shank* of a mandrel to contact the surface being ground. Frictional heat will burn both the work and the mandrel. The former, partially annealed at point of such contact, will charge with diamond sput and probably be ruined.
5. It is generally more economical and efficient to consider mandrels as expendable and make a new one for each job. Since the cost is only a few cents, use of an old one, or even the time spent trying to match one to requirements, is hardly justified.
6. Because mandrels cannot be trued with a diamond, it is necessary to measure both the top and bottom of a hole

while grinding, in order to avoid a ridge.

7. In view of point 6, it is advisable to set the work up on parallels of sufficient height to enable measurement from beneath the workpiece, Fig. 2.

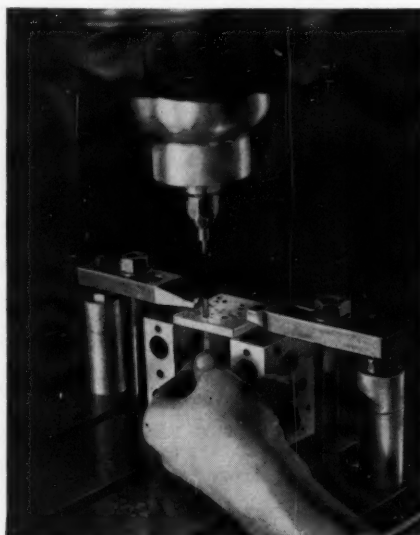


Fig. 2. Workpiece is mounted high enough to permit measuring bottom as well as top of hole.

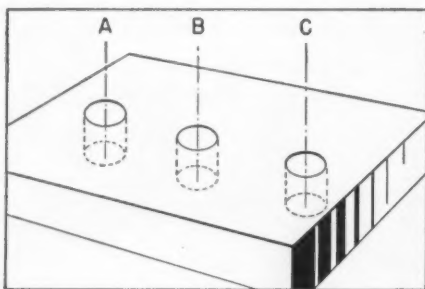


Fig. 1. In grinding three holes to size, A and B are roughed to within .001"-.002", and C within about .005". Using a freshly charged mandrel, C is finished to size, thereby breaking down the high points on the tool. A and B may now be safely ground to size.

Get ALL the answers from this new, 424-page book

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HEAVY MACHINE TOOLS...

TO MEET TODAY'S PRODUCTION DEMANDS

NILES 30'

Heavy Vertical Boring Mill

wholly mechanical or electronic operation,

including complete electronic

feeding. Swing sizes

of 100" and up.

Equipped with one

right-hand and one left-hand

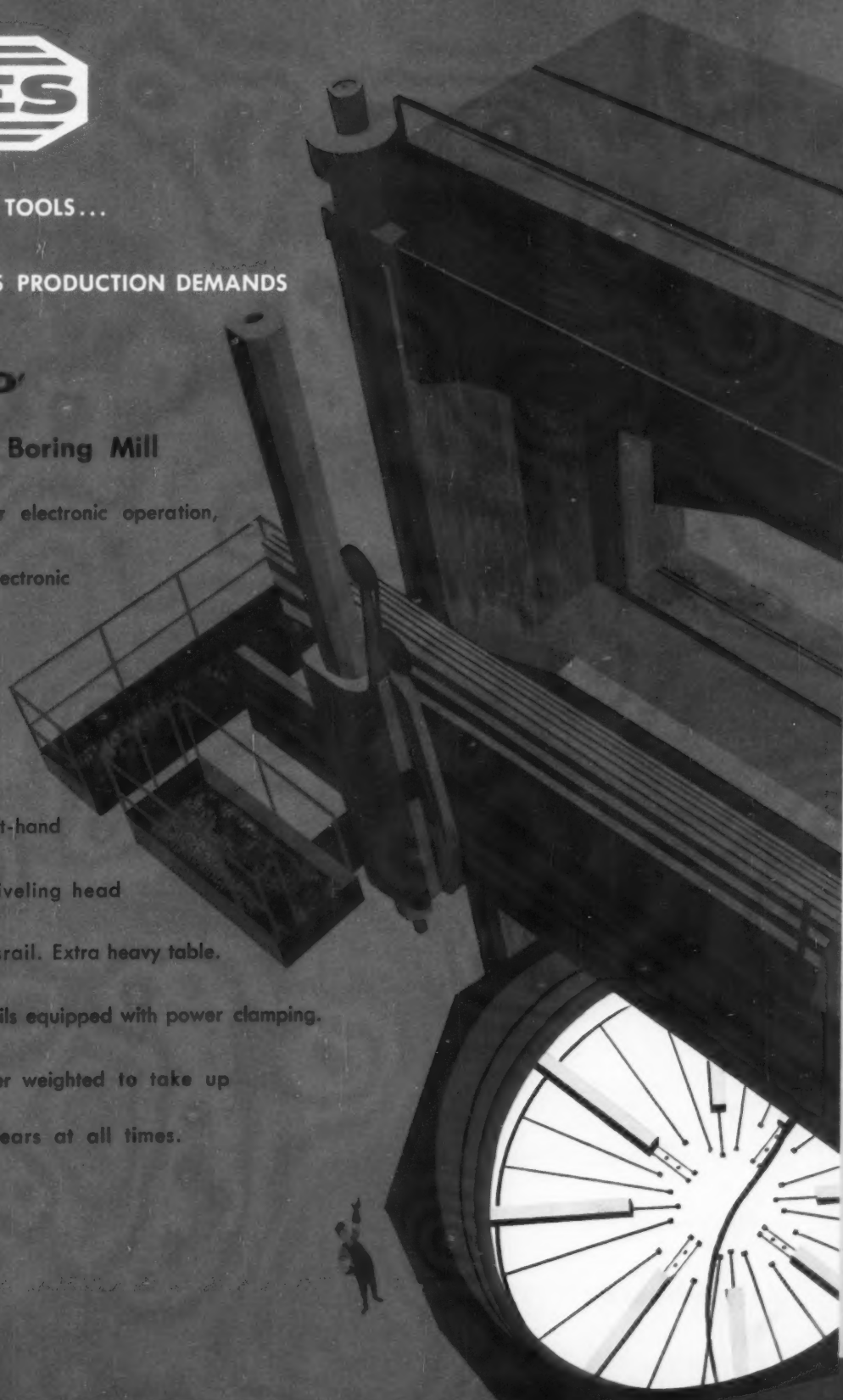
octagon-type bar swiveling head

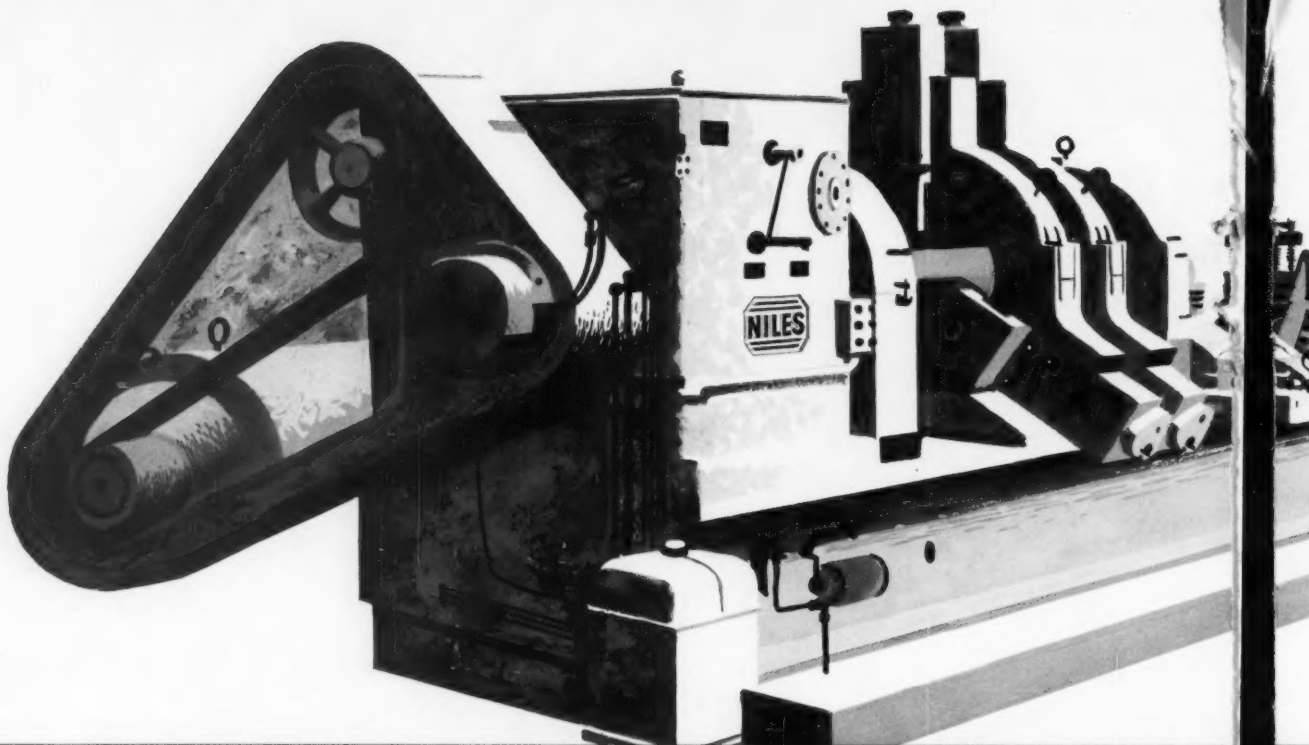
installed on the crossrail. Extra heavy table.

Crossrail rams and rails equipped with power clamping.

Rams are over-counter weighted to take up

backlash in feed gears at all times.





NILES heavy machine tools

NILES 50" Heavy Duty Engine Lathe

swing over bedways 50½". Specifically designed

for heavy-duty applications and carbide tooling.

Available with electronic or mechanical

feed. NILES manufactures its 50"

lathe standard equipped with a 60 hp

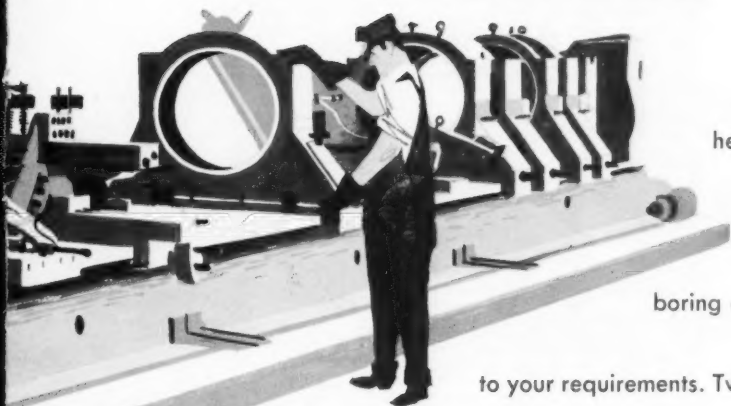
motor. Other lathes with built in

ranges for swings of 60", 70", 80",

90" and larger.



NILES 36" Heavy Duty Trepanning Lathe



equipped with special dynamically balanced headstock, with 1000 rpm to the spindle. 150 hp

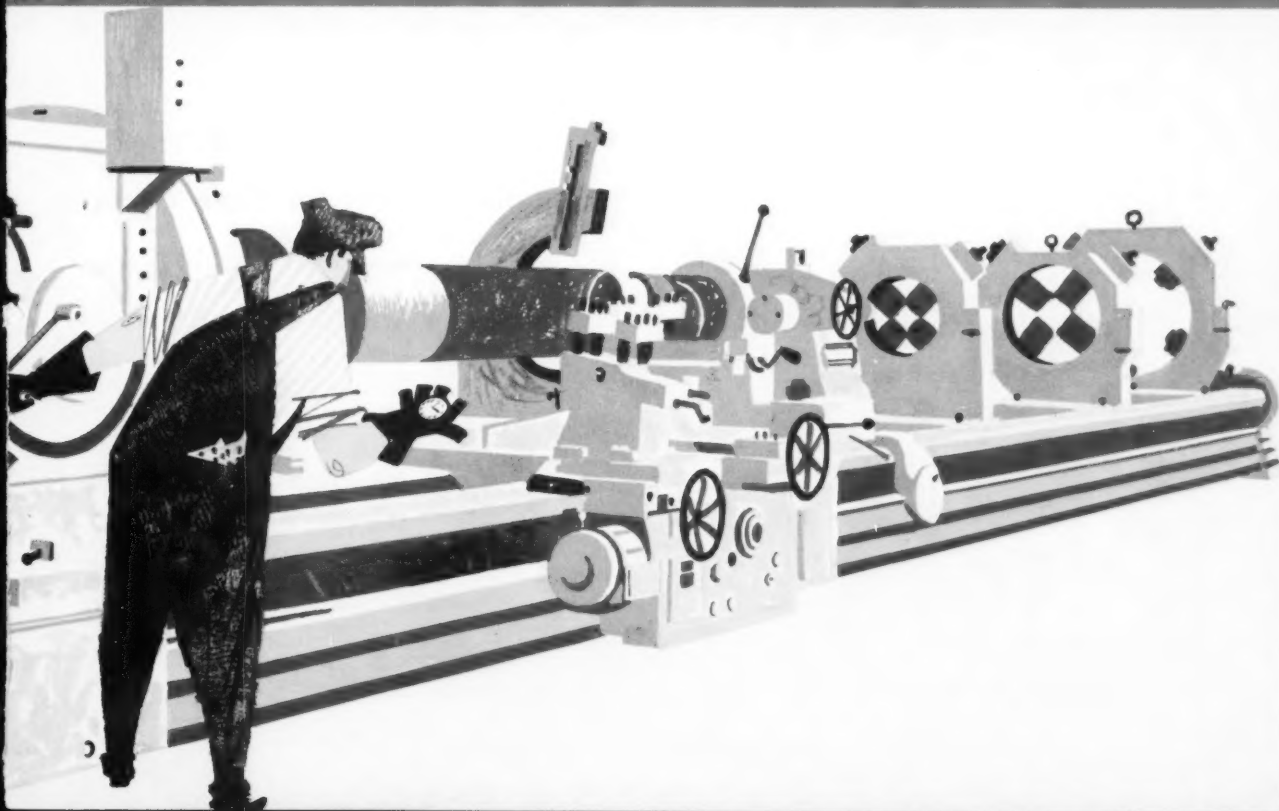
drive DC motor. Can be used for straight

boring or trepanning. Built to trepan and bore pieces

to your requirements. Two 30 hp coolant pumps, with 150 gallons per

minute capacity. Bores and trepans at rate of 10" per minute.

... to meet today's production demands



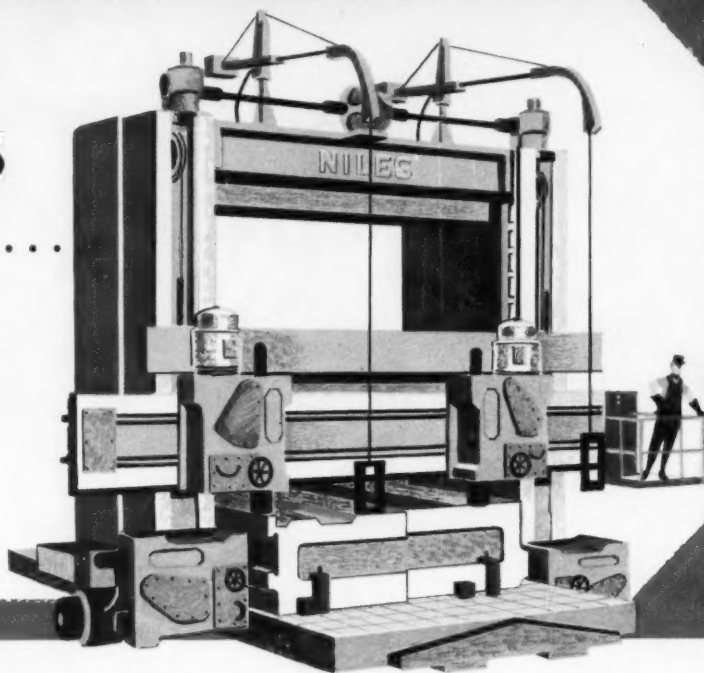
NILES

Heavy Machine Tools . . .

To meet today's

production

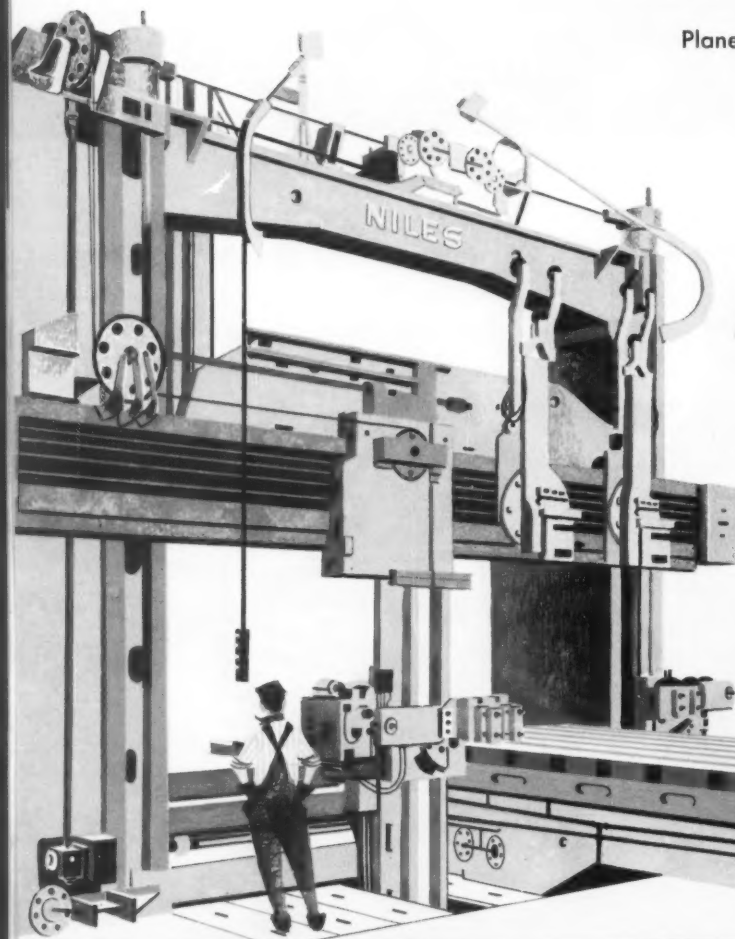
demands



NILES 15' x 15' Planer Type Mill

with 2 rail and 2 side milling heads, and 15' x 30' table.

Planer mills facilitate work particularly where pads
and irregular pieces must be machined.



NILES 23" Special Auxiliary Housing Type Planer

with 12' x 36' table and auxiliary housing.

In extended position will handle 23' between
housing uprights.



Hamilton Division

BALDWIN-LIMA-HAMILTON

where NILES Machine Tools are manufactured

announcing A NEW NEW BRITAIN +GF+ COPYING LATHE

designed for the highest production jobs in the world

THE New Britain +GF+ Copying Lathe was originally designed as a highly versatile quickly-tooled machine, which is available in eight different models, and is an outstanding profit maker on both short and long runs.

Now New Britain has added two new models, the $1\frac{1}{2}$ s and $1\frac{1}{4}$ u which successfully apply the basic principles of this new approach to copy turning, to the highest production applications in metalworking history. One of these new machines, a typical work piece and diagrams of the operations performed, are shown on the two following pages.

If you have work that requires contour turning and facing, the New Britain +GF+ has basic profit-making advantages. You should know about them, regardless of whether your needs call for small lots, or automated long-run production.

A NEW APPROACH TO COPY TURNING is the title of a new color motion picture which is available for showing in your plant. Ask your New Britain Representative, or write The New Britain Machine Company, New Britain, Connecticut.

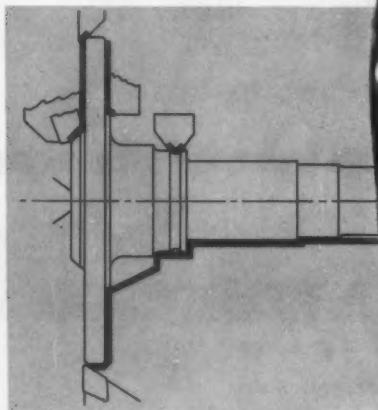
(See the following two pages for more details)



New High-production New Britain +GF+

... continued from preceding page

a new approach to important savings



For the typical rear axle shaft illustrated, a double carriage design plus infeed attachment permits machining both ends at once, eliminating wasteful idle time.

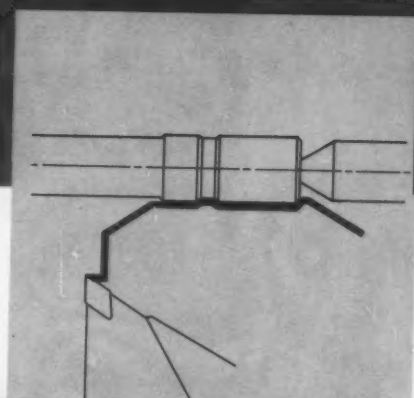
This new copying lathe features pick-off change gear headstock, combined with a selector lever for high and low spindle speed range. Its basic advantages of template control, easy chip removal and elimination of expensive form tools are readily adaptable to a wide variety of work which ordinarily would require many more tools, and, in some cases, further operations on additional machines. Get the facts from your New Britain Sales Representative or write the factory.



The NEW BRITAIN MACHINE COMPANY

Copying Lathe...

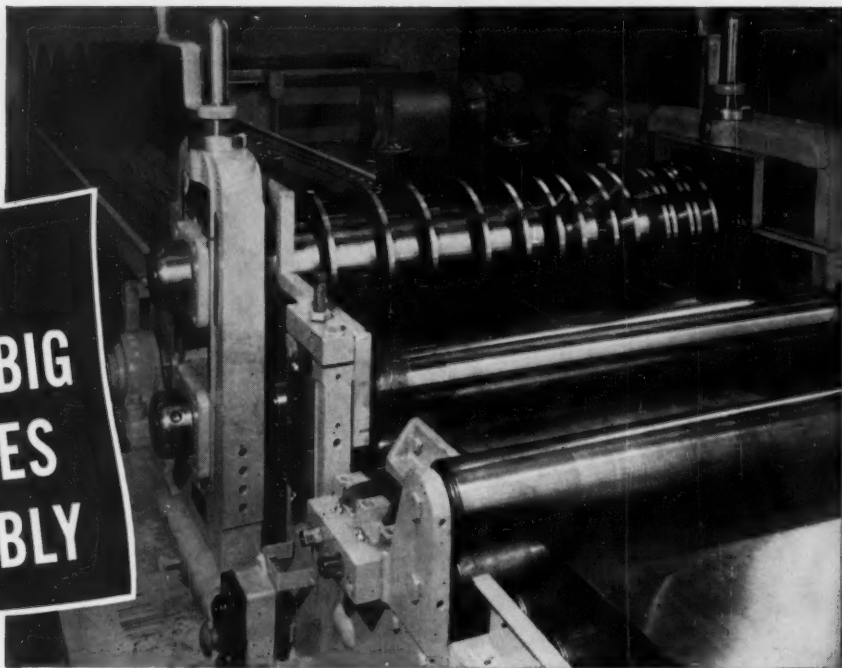
on your "expensive" pieces



New Britain-Gridley Machine Division, New Britain, Connecticut • Lucas Machine Division, Cleveland 8, Ohio

• AUTOMATIC BAR and CHUCKING MACHINES • PRECISION BORING MACHINES
• LUCAS HORIZONTAL BORING, DRILLING and MILLING MACHINES • NEW BRITAIN 40+ COPYING LATHES

**TO SLIT
SMALL or BIG
TONNAGES
PROFITABLY**



Profitable slitting of *big tonnages* is assured with Yoder slitting line units engineered for big coil sizes, with gauges and speeds to suit the needs of rolling mills and other big producers and users of flat rolled metal. Many such Yoder lines have paid for themselves in a few months, and proved exceedingly profitable over the years.

For *smaller tonnages*, Yoder has standardized a series of slitter units and made them available at such moderate cost that their operation is *profitable on monthly requirements as low as 100 tons and even less.*

Because of the great convenience, in addition

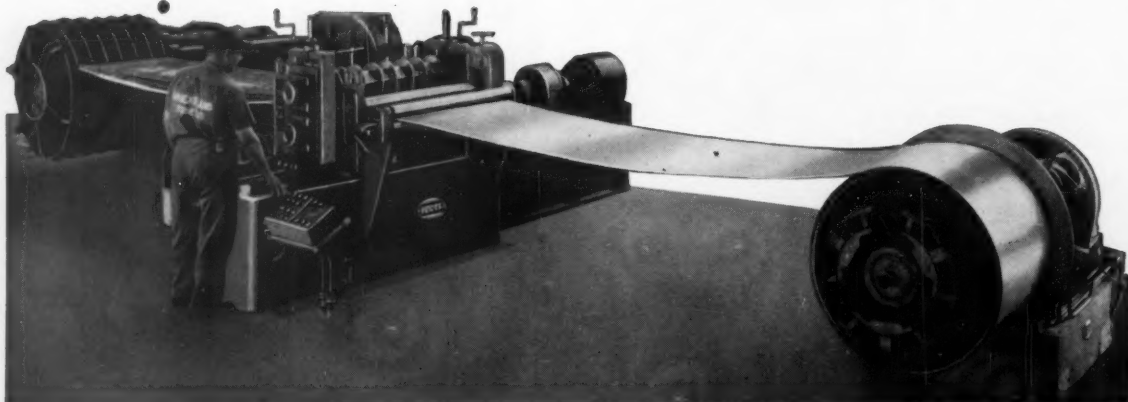
to the economy, of being able at all times to supply their own requirements in slit strands, to meet expected or unexpected needs, a host of metal fabricators in recent years have installed these Yoder slitters, and the number is growing insistently.

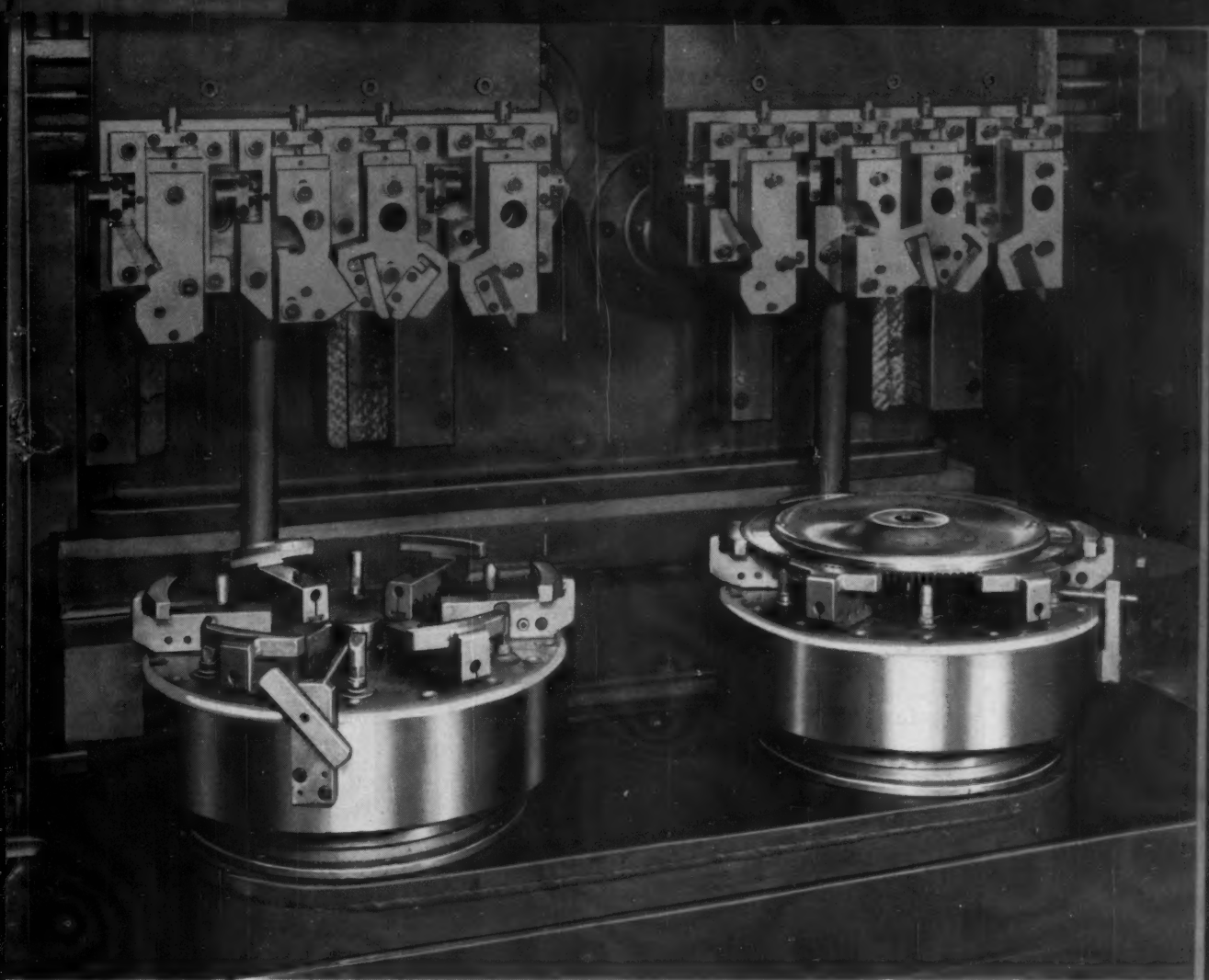
The YODER SLITTER BOOK contains production records, time studies and much other useful data on the mechanics as well as the economics of slitter operations. A copy is yours for the asking.

THE YODER COMPANY

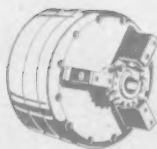
5504 Walworth Ave. • Cleveland 2, Ohio

**SLITTING LINES • ELECTRIC WELD TUBE MILLS
COLD ROLL FORMING PRODUCTION LINES**





One Moment, Please —



The world's finest machine tools are on display at the Machine Tool Show in Chicago. Our congratulations to this great exhibition. And may we be so practical as to remind that the world's finest machine tools can be no better than the accuracy of the work holding devices? Quite naturally we want to point out, too, that Woodworth produces the most accurate, dependable chucks for precision manufacturing in America. Drop us a line and we'll prove it to your satisfaction.

"Accuracy you can trust"

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MINSTER

First in Press Design

A MATTER OF RECORD

A few of the Minster FIRSTS in Press Design

1937—Patented Minster Combination Air Operated Friction Clutch and Brake Unit.

1937—Full Box Type Crown and press construction.

FIRST—To offer Box construction in large "C" frames and slides.

1938—Barrel Type Slide Adjustment.

FIRST—With recirculating oil lubrication on presses.

1946—Combination Air Friction Clutch and Brake mounted on crankshaft in either flywheel or main gear and having controlled torque.

1947—Patented Minster Rotor Type Rotary Limit Switch.

FIRST—To give you replaceable bronze lined wear surfaces throughout press.

Chapter 1955

You'll see more

MINSTER FIRSTS

at the

Machine Tool Show

BOOTH 1410

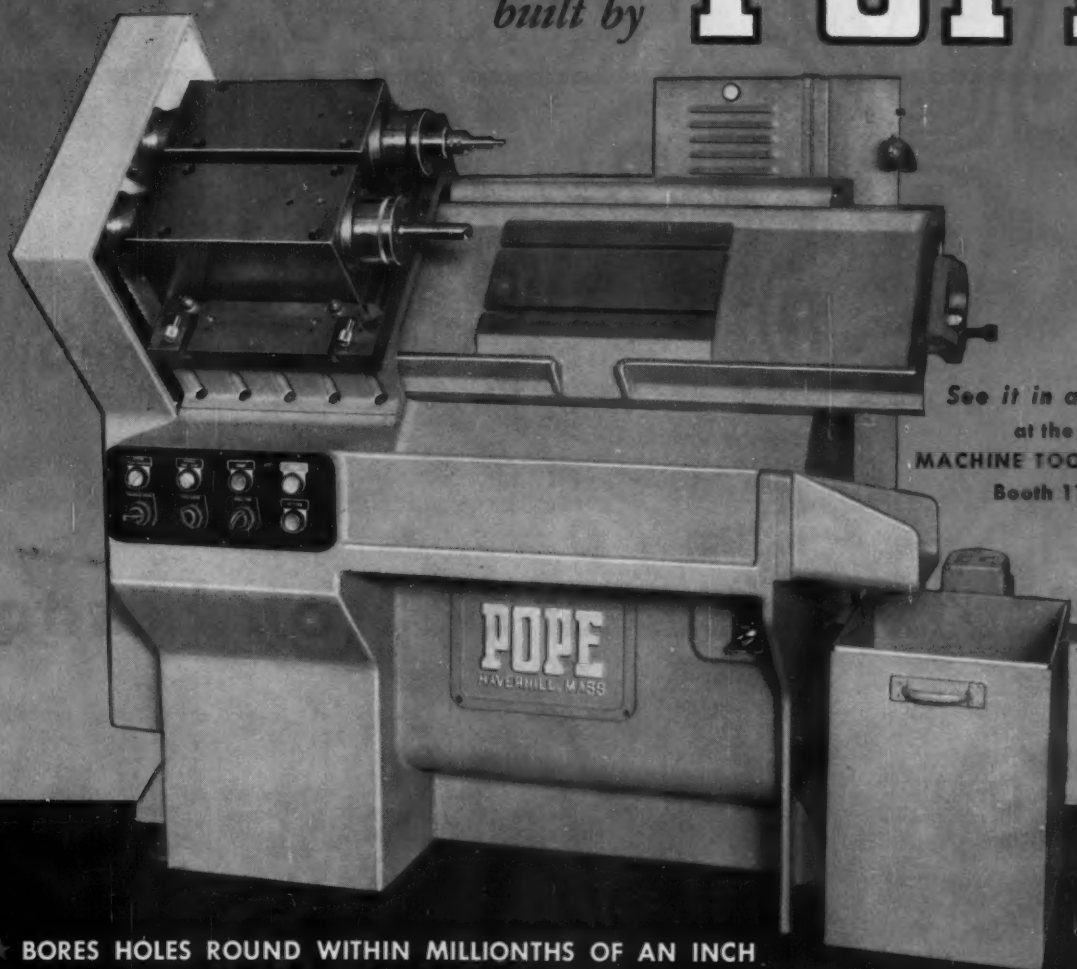
CHICAGO

SEPTEMBER 6-17, 1955

THE MINSTER MACHINE COMPANY

MINSTER, OHIO

NEW SUPER-PRECISION BORING MACHINE *designed and built by* **POPE**



See it in action
at the
MACHINE TOOL SHOW
Booth 117

No. 104

- ★ BORES HOLES ROUND WITHIN MILLIONTHS OF AN INCH
 - ★ Electrically controlled table provides infinitely variable feed and traverse all in one separate cabinet.
— no cams, no change gears, no sprockets, no linkages.
 - ★ Automatic operating cycle includes timed loading period when desired.
 - ★ Forty-five degree angle table and bridge for rapid loading and unloading — free flow of coolant and chips.
- For super-precision boring and the continuous production of accurate parts —
For the very latest design in simplicity and versatility —

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POPE MACHINERY CORPORATION**

Established 1920

261 RIVER STREET, HAVERHILL, MASSACHUSETTS
Builders of Pope Precision Spindles and Boring Machines



NEW BRITAIN

Automatics

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The NEW BRITAIN MACHINE COMPANY

LUCAS

of Cleveland

more profitable metalworking

**BOOTH
1419**

**THE
MACHINE TOOL
SHOW**

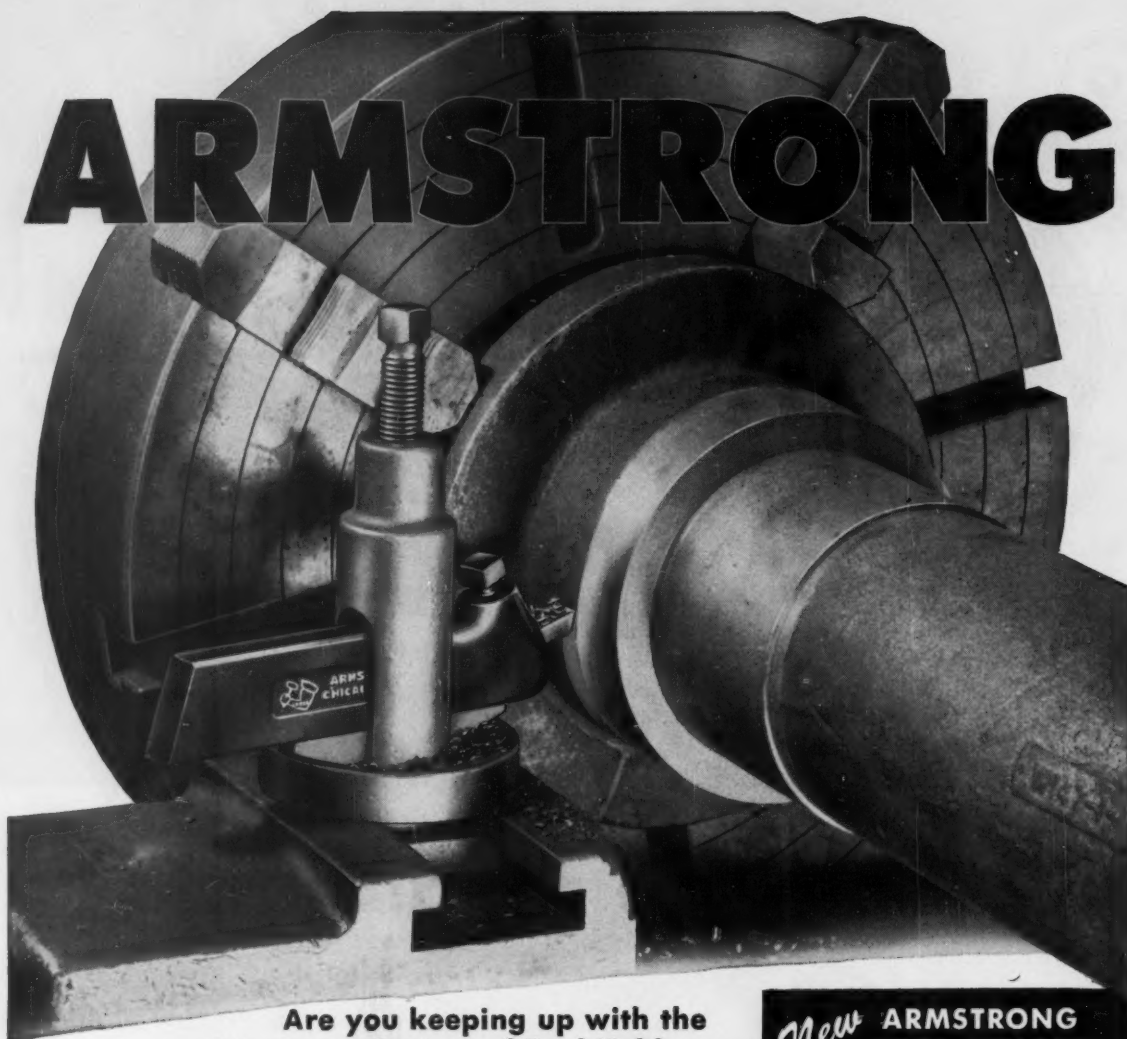
**CHICAGO, ILL.
SEPT. 6-17, 1955**

INTERNATIONAL AMPHITHEATRE



**New Britain-Gridley Machine Division, New Britain, Connecticut
Lucas Machine Division, Cleveland 8, Ohio**

ARMSTRONG



Are you keeping up with the Armstrong System of Tool Holders

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ing Machinery &
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6-17



Doubtless you are daily using ARMSTRONG TOOL HOLDERS that have been in continuous operation for many years. This is sound practice, for this means added profits without added tool costs. But to become complacent, so satisfied that you forget your ARMSTRONG TOOL HOLDERS, is unwise. The "Armstrong System" is a growing thing, with new types and sizes of ARMSTRONG TOOL HOLDERS constantly being developed to more effectively meet new machining conditions, or to take advantage of newly developed cutting materials.

With modern ARMSTRONG TOOL HOLDERS for each operation, you can greatly increase speeds and feeds. You can lower machining cost and further increase profits.

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Spring
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ARMSTRONG
Carbide
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for
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ARMSTRONG
"C-A" Tool
Holders for
ARMALLOY
(Cast-Alloy)
Cutter-Bits

ARMSTRONG BROS. TOOL CO.

"The Tool Holder People"®
5213 W. ARMSTRONG AVENUE CHICAGO 30, ILL.

AND NOW A NEW PRATT & WHITNEY KELLER

**AUTOMATIC
TRACER-CONTROLLED
MILLING
MACHINE**



THE BL 3622

MODEL C

WITH THESE IMPORTANT *NEW FEATURES* . . .

- **HEAVIER, MORE RUGGED** . . . to take tough production schedules in stride day after day.
- **MORE POWER (10 hp)** . . . for increased metal removing capacity on today's tough new alloys.
- **BIGGER CAPACITY** . . . to handle larger, heavier workpieces.
- **WIDER RANGE OF SPINDLE SPEEDS** . . . with a single, full-range spindle for all speeds . . . 30 to 3600 rpm in 20 steps. Spindle furnished with either No. 12 B&S or No. 50 MM taper bore.
- **POWER DRIVEN CHIP CONVEYOR** . . . no need to stop and shovel chips piled up by fast metal removal.
- **FASTER TRACER RESPONSE** . . . through a new electronic control of machine motions, travel speeds, and feeds.

- **PHENOLIC-TO-METAL BEARING SURFACES** . . . eliminate scoring of ways and preserve original high accuracy.
- **OPTIONAL RAPID TRAVERSE** . . . for vertical and horizontal movements.
- **ONE-SHOT LUBRICATION SYSTEM** . . . insures quick, positive thorough lubrication of all important sliding surfaces.

The NEW BL 3622, Model C is a powerful, horizontal spindle miller that reproduces the shape of any 2-dimensional template or 3-dimensional full model quickly and accurately. Complex or irregular dies, molds, prototypes and other workpieces that cannot be conveniently machined by any other method are handled as easily and economically as simple work. The Keller BL Machine is built *specifically* for tracer-controlled milling — not just "adapted". It is rugged, dependable, relatively simple . . . stays on the job year after year.

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SINCE



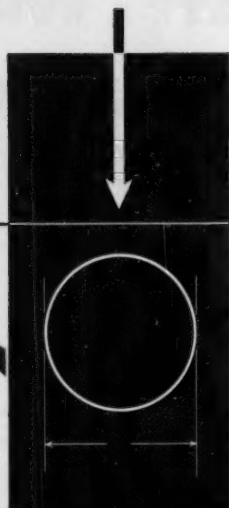
MACHINE TOOLS • CUTTING TOOLS • GAGES
1860

Air Gaging for Automation

**Some Taft-Peirce CompAIRator
Air Gage Installations for mass
production quality control...**

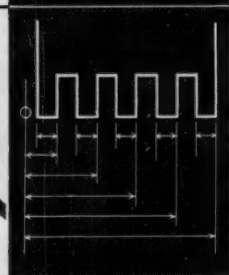
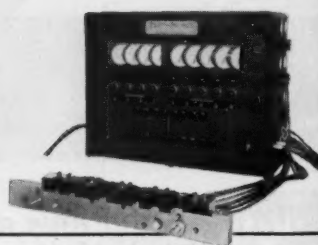
Size Control on Automatic Lathe

This T-P Air-Electric CompAIRator is attached to an automatic lathe. As parts approach tolerance limits, gaging unit sends an electrical impulse to machine, which advances or retracts cutting tool to keep parts in optimum size range. If a part is produced outside the tolerance limits, unit shuts down the machine.



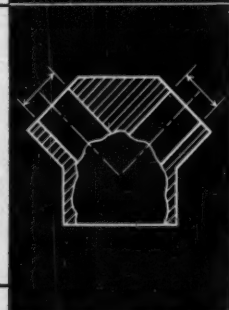
Size Control at Milling Machine

This T-P Air-Electric CompAIRator checks locations and widths of the main bearings of automotive cylinder blocks. 9 dials and lights indicate 5 bearing locations and 4 widths simultaneously. When any location or width is out of tolerance, unit automatically stops milling machine. Light indicates off-size dimension, dial reports exact size.



Size Control in Transfer Machine

This T-P Air-Electric CompAIRator checks 8 cylinder bore diameters simultaneously in V-8 automotive engine blocks. Automatically gages the diameter of the entire length of each bore. If any bore is out of tolerance, a light points it out, and production line is automatically shut down at completion of gaging cycle. Tolerance: .002".



Get the full story
at the show
Booth 811

*T-P means
Top Precision*



WHAT IS A COMPAIRATOR AIR GAGE?

A CompAIRator is a sensitive gaging instrument that measures variations in the velocity of tiny jets of air. When work is placed over these jets, air flow is restricted and its velocity reduced. Any change in air velocity reflects a change in part size, which is immediately shown on a calibrated indicator. Since only air contacts the part in most cases, there is minimum wear on gaging members. Fast, accurate, dependable, a T-P CompAIRator is simple to operate, requires little or no maintenance.



STANDARD AND SPECIAL
COMPAIRATORS



COMPUTING
COMPAIRATORS

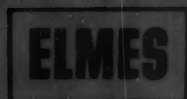


AUTOMATIC SORTING
MACHINE

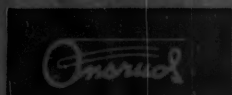


AIR ELECTRIC
COMPAIRATORS

THE TAFT-PEIRCE MANUFACTURING COMPANY, WOONSOCKET, RHODE ISLAND



These 54 COMPANIES Use
VICKERS® HYDRAULICS
on Machines They are Exhibiting
at the MACHINE TOOL SHOW

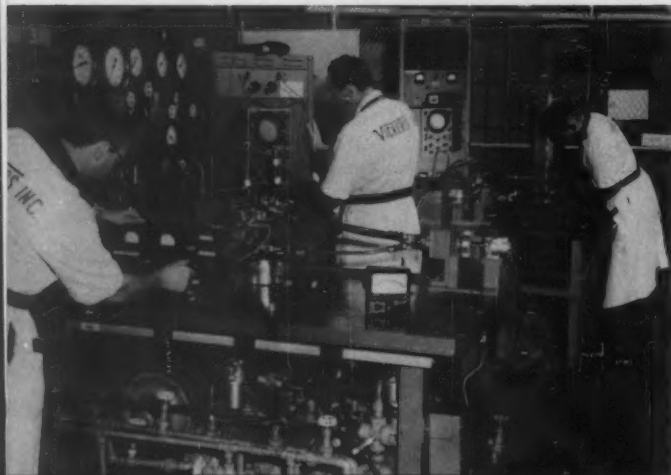


Why

VICKERS® HYDRAULICS PREDOMINATES on Modern Machine Tools

The large number of Vickers-equipped machine tools that you will see in the Show is no accident. It is due to wide recognition of the many advantages of Vickers Oil Hydraulics. Some important

reasons behind this preference for Vickers are mentioned here. There are many more . . . the nearest Vickers Application Engineer will be glad to discuss them with you.



LONG-ESTABLISHED QUALITY

Vickers leadership in quality is the summation of many things. Important among these is the program of continuous research that has been maintained through the years and has resulted in a long and impressive list of pioneering developments. Representative of these are: Hydrostatic Relief Valve . . . Balanced Vane Type Pump . . . Flow Control Compensator . . . Axial Piston Pump and Motor. These, and many other developments by Vickers during more than three decades, have contributed substantially to the advancement of hydraulics for machine tools.



FACTORY-TRAINED APPLICATION ENGINEERS

Thoroughly trained in all phases of oil hydraulics at Vickers plants, this large group of salaried men is exceptionally well qualified to help make hydraulics more useful. They command the wealth of Vickers Hydraulics resources to perform many services . . . from complete circuit design to helping get the "bugs" out of a prototype machine.

Be Sure to See the **VICKERS®** Exhibit at the Machine Tool Show, Booth 814.

STANDARD **VICKERS** UNITS CAN BE COMBINED TO
Economically PROVIDE EVERY HYDRAULIC POWER and CONTROL FUNCTION



Single Stage Balanced Vane Type Pump . . . the most widely used of all pumps in oil hydraulic service.



Two-Pressure Pump automatically delivers larger volume at low pressure and smaller volume at high pressure.



Variable Delivery Axial Piston Type Pump has low inertia forces, higher rotative speeds and very high efficiency.



Power Unit is a compact self-contained power source that frequently results in design simplification and cost savings.



Balanced Piston Type Relief Valve more accurately controls system operating pressure and protects against overload.



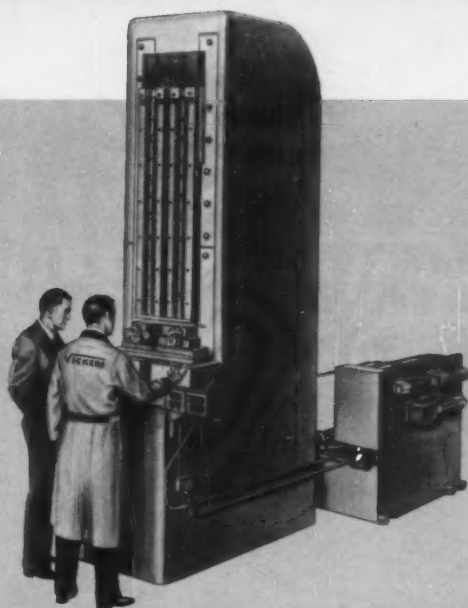
"Hydrocushion" Type Pressure Control Valve for control of unloading and sequence of oil flow in hydraulic system.

Why

VICKERS® HYDRAULICS PREDOMINATES on Modern Machine Tools

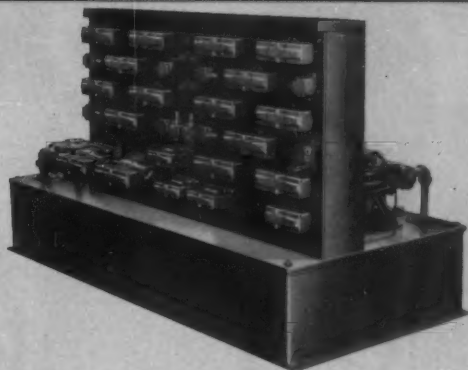
FACTORY-TRAINED FIELD SERVICE SPECIALISTS

Vickers equipment is designed and built to hold service requirements to an irreducible minimum. But no machinery built by man escapes service completely. When Vickers equipment requires service, it is handled by full-time Field Service Specialists working out of Vickers offices from coast to coast. These men, carefully trained in Vickers plants, are thoroughly competent to adjust and maintain all Vickers equipment . . . and qualified to instruct customers' service organizations in improving their own hydraulic maintenance practices.



UNDIVIDED RESPONSIBILITY

Many machine builders prefer to use Vickers hydraulic equipment exclusively because it gives them the advantage of undivided Vickers responsibility. Since 1921, Vickers has accumulated a great store of specialized knowledge in hydraulics . . . has developed the extensive line of equipment needed to take undivided responsibility. With Vickers equipment throughout, there is no risk of incompatibility of hydraulic components . . . optimum operation is assured.

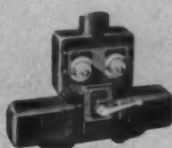


For further information, ask for new Catalog 5001A.

STANDARD VICKERS® UNITS CAN BE COMBINED TO
Economically PROVIDE EVERY HYDRAULIC POWER and CONTROL FUNCTION



Adjustable Flow Control Valve that eliminates jumping and speed variation because of load change.



Traverse and Feed Cycle Control Panel provides any sequence of rapid advance, adjustable feed, dwell and rapid return.



Solenoid Controlled Pilot Operated 4-Way Valve for controlling direction of oil flow remotely and electrically.



Deceleration Valve smoothly diminishes (or increases) oil flow as cam mechanism depresses the valve plunger.



Vane Type Hydraulic Motor has hydraulic balance, high efficiency and exclusive "rocking-beam" construction.



"Compact" Hydraulic (Oil) Cylinder has piston rings or improved cup seals and is available in 5 standard mountings.

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See the latest
ball bearing applications
in new machinery at
MACHINE TOOL SHOW

See new ball bearing developments at
PRODUCTION ENGINEERING SHOW
BOOTH 131

CATCH UP with the latest type of ball bearings available for machine tool construction — on display at Booth 131.

LOOK OVER the wide assortment of super-precision and ultra high speed types of ball bearings available.

EXAMINE the unique Fafnir-originated Torque Tester.

CHECK unusual and successful applications of machine tool ball bearings featured in cut-away spindle models and large drawings.

DISCUSS machine tool bearing problems with experienced bearing specialists.

GET new, useful engineering literature and your name listed for a copy of the *new general catalog*.

The Fafnir Bearing Company, New Britain, Conn.

FAFNIR BALL BEARINGS

MOST COMPLETE



LINE IN AMERICA





CINCINNATI EXPANDS LOW-COST TRAY-TOP LINE —NOW THERE ARE SIX NEW LATHES

The good news here takes two directions: (1) Cincinnati Tray-Tops are available now in 10", 12½", 15", 18", 21½" and 26" sizes, and in engine, toolroom and fixed gap bed models. (2) The complete Tray-Top line is designed to provide *new* production convenience and *new* operator safety.

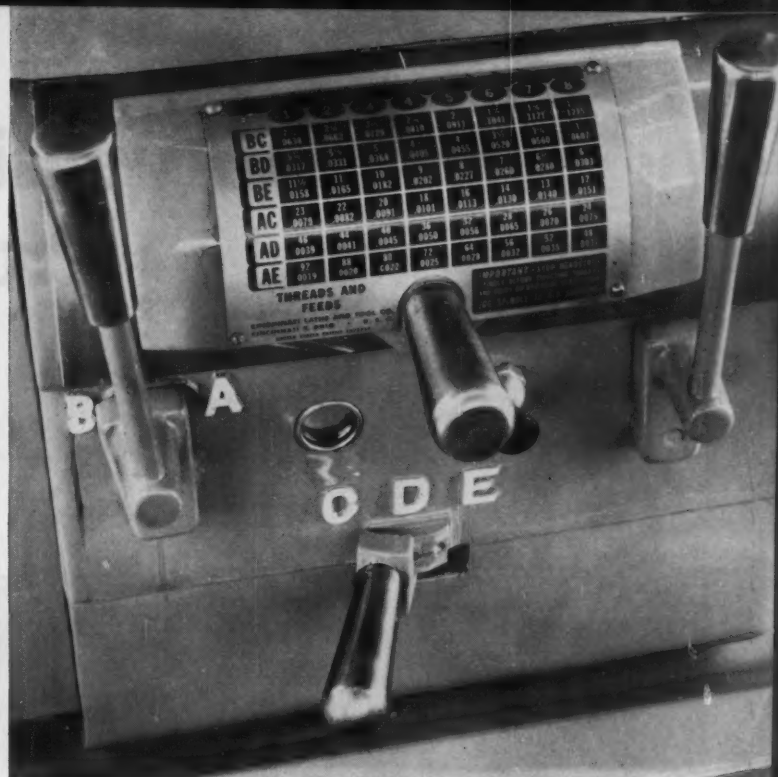
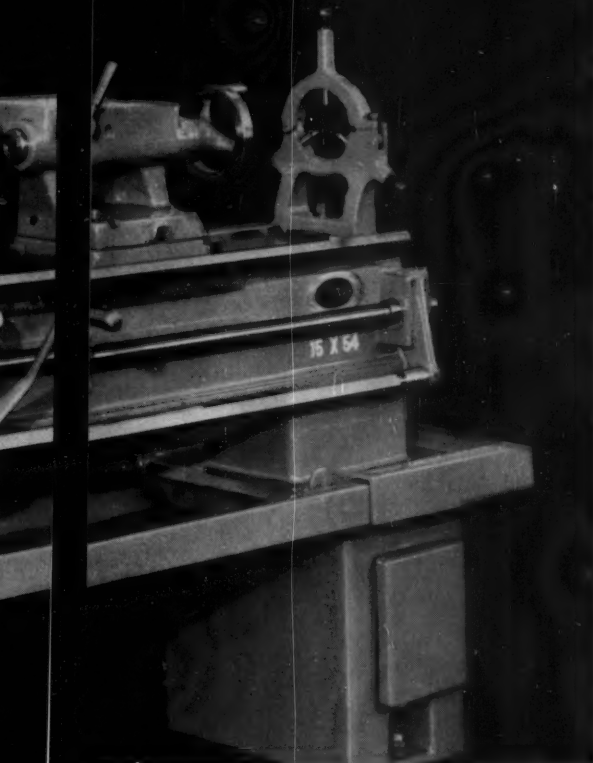
To job shops, maintenance shops, schools and production shops, the new, complete line of Tray-Tops means that the majority of jobs can now be done on

modern standard machines at a modest primary investment.

In every respect, Cincinnati Tray-Tops are precision machines, built to hold their accuracy through years of continuous hard work. Your local Cincinnati dealer will explain the solid business advantages you get with Tray-Tops. For the name of dealer nearest you, plus complete catalog material, write Cincinnati Lathe and Tool Co., 3269 Disney, Cincinnati 9, Ohio.



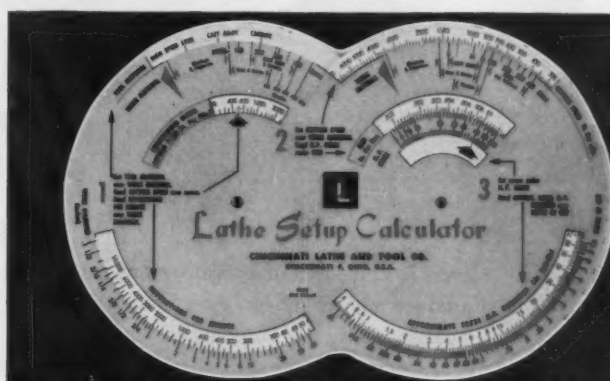
On display at
BOOTH NO. 369



TOTALLY ENCLOSED QUICK-CHANGE BOX guards gears against dirt, chips and foreign matter. 54 thread and feed changes: range of $1\frac{1}{4}$ to 92 threads per inch; range of feeds, .0019 to .1215.



COLOR-MATCH SPEED SELECTOR is simplicity, itself. No more reference to index plates and lever positions; just match up the color lines. Standard spindle speed ranges are 35 to 1200 rpm; 25 to 980; or 16 to 640; with higher ranges available at extra cost. Pressurized lubrication to bearings and gears. Three-bearing spindle. 3" diameter spindle hole available on larger sizes.



Get your Cincinnati Turning Calculator now or during the **MACHINE TOOL SHOW** at **BOOTH 309**

With this new, attractive calculator, complete with instruction booklet—

IT'S EASY

... to select speeds and feeds for your job lot, toolroom or initial production runs.

IT'S SIMPLE

... to determine the most economic cutting speed for your high production runs.

JUST

... print your name, firm, address, city, zone and state, and mail with \$1 (check or money order) to Cincinnati Lathe and Tool Co., Cincinnati 9, Ohio.

Cincinnati Lathe and Tool Co., Cincinnati 9, Ohio, U.S.A.

Enclosed is \$_____ in payment for _____
Cincinnati Turning Calculator. Please ship to:

Name _____

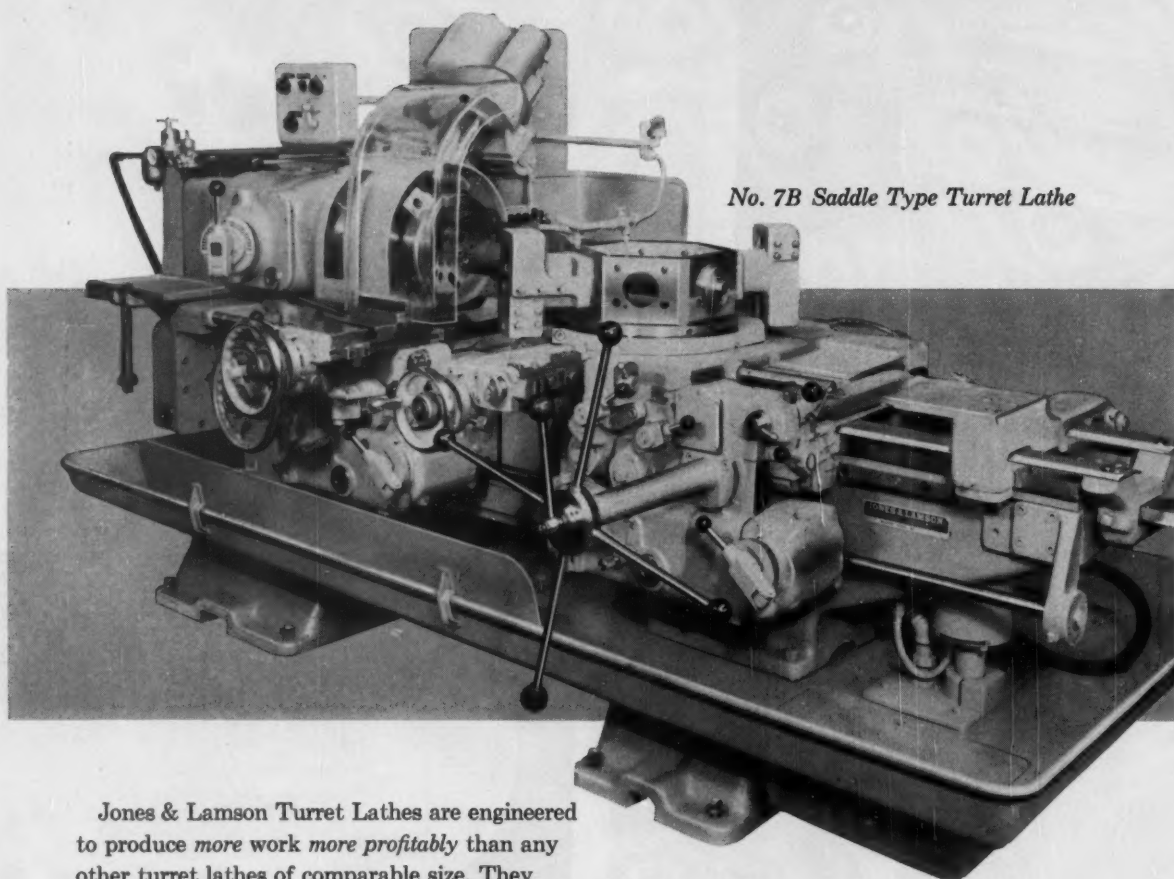
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Engineered for Precision...

Powered for Production...



No. 7B Saddle Type Turret Lathe

Jones & Lamson Turret Lathes are engineered to produce *more work more profitably* than any other turret lathes of comparable size. They have the rugged, rigid construction that makes possible greater accuracy and the use of Hi-Velocity turning; and they incorporate many superior features that assure **PRODUCTIVE CAPACITY** unmatched in its class. Adequate spindle speeds and horsepower insure the proper use of carbide cutting tools at surface speeds of 650-750 feet per minute.



JONES & LAMSON MACHINE COMPANY

Jones & Lamson offers you a choice of methods for acquiring modern, profit-producing J & L equipment. In addition to outright purchase, J & L makes available several different "Pay-From-Productivity" plans at interest rates of 3¼% and lower (add-on), and a broad variety of lease plans.

Send today for complete details on J & L's machines, methods and Procurement Plans. Simply fill in the coupon, clip it to your letterhead and mail.

and capable of doing jobs like this...

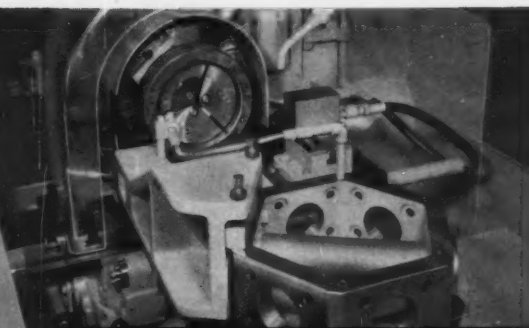
Machine tools do not pay dividends unless they are cutting metal. Engineering the tooling around the parts to be produced reduces the setup time to a minimum, and in many cases doubles the production per labor hour.

In this case high production methods of tooling for automatic lathes were simplified and applied to three 7B J&L Universal Saddle Type Turret Lathes. Inner and Outer Ball Bearing Races and Roller Bearing Races are produced on the same machines. Setup time from one lot to the next does not exceed fifteen to twenty minutes per machine.

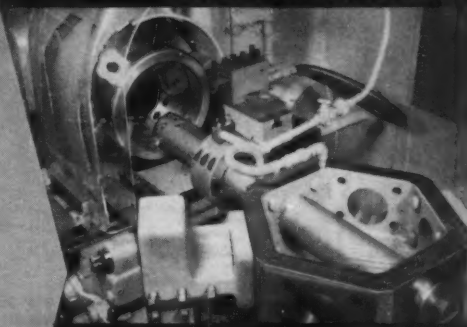
MACHINE TOOL DIVISION

UNIVERSAL TURRET LATHES • FAY AUTOMATIC LATHES • AUTOMATIC DOUBLE-END MILLING & CENTERING MACHINES • AUTOMATIC THREAD & FORM GRINDERS • OPTICAL COMPARATORS
AUTOMATIC OPENING THREADING DIES & CHASERS

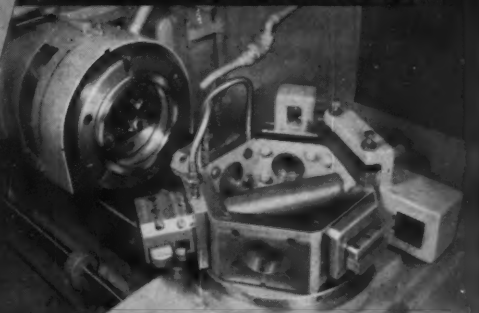
512 Clinton St., Dept. 710, Springfield, Vt., U.S.A.



First Operation: One tool mounted on the Hex Turret turns the O.D. while a tool mounted on the rear of the cross slide faces one end. At the end of the facing cut, the radius on the O.D. is formed. Floor-to-floor, 1.94 min.



Second Operation: Location is taken from the two previous finished surfaces. Boring and I.D. chamfering are performed by using tools mounted on the Hex Turret while facing and forming of the O.D. are finished by tools mounted on the rear of the cross slide. Floor-to-floor, 2.57 min.



Third Operation: Special wrap-around jaws mounted on a power-operated three-jaw scroll chuck are used for holding the finish turned ring when grooving. The groove is formed by a radius tool held in a bar mounted on the Hex Turret (this applies to internal or external straight or taper races). I.D. is also chamfered in this operation. Floor-to-floor, 1.67 min.

Jones & Lamson Machine Company
512 Clinton St., Dept. 710, Springfield, Vt., U.S.A.
Please send me the J & L Machine Tool Replacement Information Kit.

Name _____
Title _____

What's Taft-Peirce Featuring

MACHINE TOOLS



T-P NO. 1 SURFACE GRINDER

A simple spark test demonstrates how this extraordinary surface grinder repeats to .00005". Gives finishes so smooth in many cases they seal without lapping.

T-P 6" ROTARY SURFACE GRINDER

Repeats to .00005". Wheelhead tilts up to 30 degrees; work spindle and magnetic chuck tilt 7 1/2 degrees. Adapters for sharpening Fellows Gear Shaper Cutters are available.



MAGNETIC CHUCKS



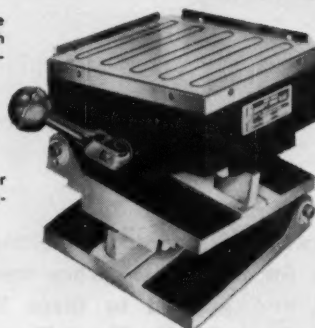
T-P SUPERPOWER MAGNETIC CHUCKS

Taft-Peirce offers a complete line of work-designed chucks with maximum power and dependability.



T-P SUPERPOWER PERMANENT MAGNET CHUCKS

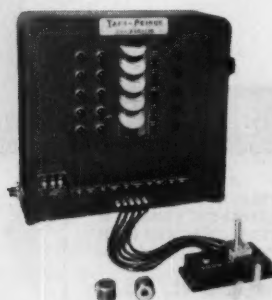
are longer, stronger, 20% lower — give greater clearance on machine tool tables.



AIR GAGES

T-P COMPUTING COMPAIRATOR AIR GAGES

Utilizing the more versatile, more dependable circuit of T-P standard air gages, a Computing CompAIRator solves simple problems — simplifies many complex measurements.



T-P AIR-ELECTRIC COMPAIRATOR AIR GAGES

speed multiple inspection jobs. Lights flash to indicate out-size dimensions. Dials give exact size.

at the Machine Tool Show

FIXED GAGES



T-P ROTOCHK

cuts thread gaging time by $\frac{3}{4}$. Push — and gage screws into work. Pull — and it disengages.

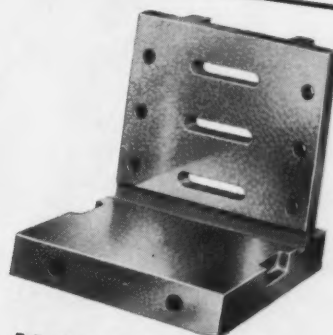
T-P PLUG, RING, SNAP GAGES

Taft-Peirce offers hundreds of different fixed gages, standard or special. One for every gaging job.



T-P GRANITE SURFACE PLATES

offer maximum accuracy with longer life. Cast Iron Plates and stands also available.



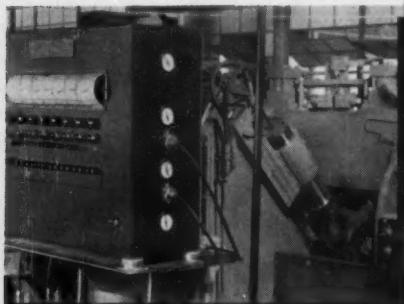
T-P ANGLE IRONS AND SINE CHECKING EQUIPMENT

are just some of the many time- and labor-saving devices that will be exhibited at the Show.

TOOL ROOM EQUIPMENT

T-P AUTOMATIC COMPARATOR AIR GAGES

make 100% quality control possible in mass production. Automatically inspects, rejects out-size parts.



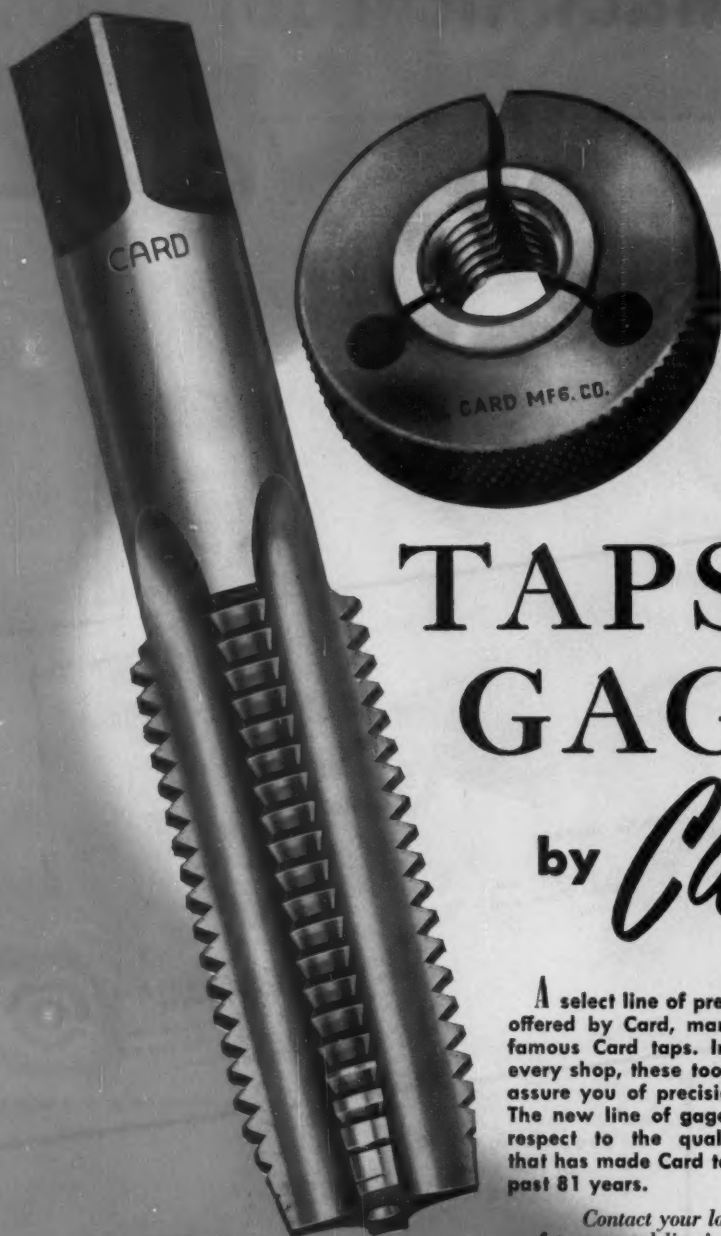
See them in action
at the Show
Booth 811

THE TAFT-PEIRCE MANUFACTURING COMPANY



*T-P means
Top Precision*

WOONSOCKET, RHODE ISLAND



TAPS *and* GAGES by *Card*

A select line of precision gages is now offered by Card, manufacturer of world-famous Card taps. In every industry, in every shop, these tools speed production, assure you of precision and satisfaction. The new line of gages is equal in every respect to the quality of manufacture that has made Card taps famous over the past 81 years.

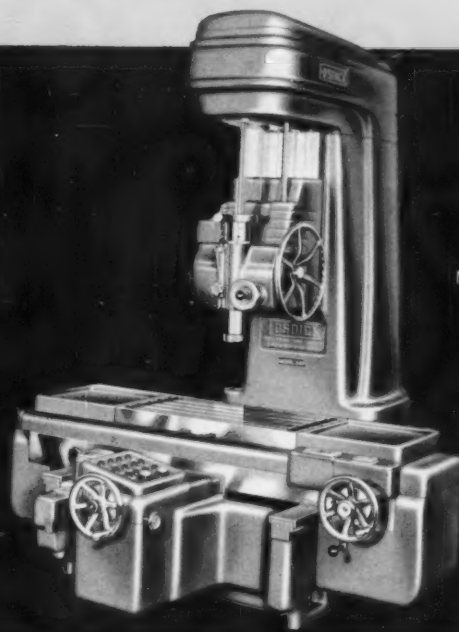
*Contact your local Card Distributor
for prompt deliveries and helpful service.*



S. W. CARD MANUFACTURING CO.
MANSFIELD • MASSACHUSETTS

Division of Union Twist Drill Co. • TAPS • DIES • SCREW PLATES • GAGES

See why at the Show--



New Jig Borer with
Direct Dimension
Measuring and
Automatic
Positioning.

It pays to get a proposal from Fosdick



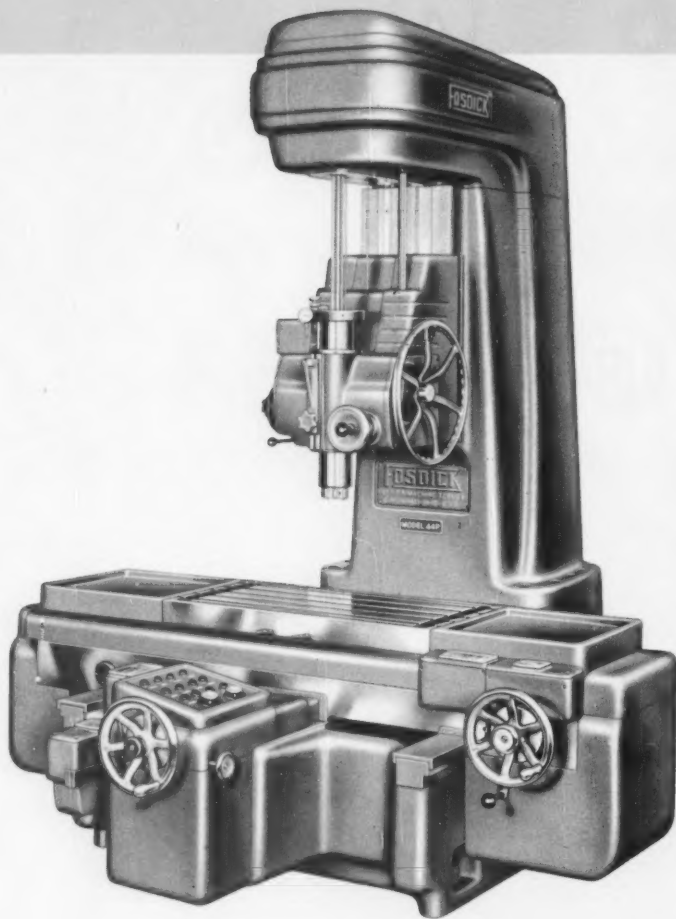
New Fosmatic Radial
Drill with Pre-selected
Feed and Speeds.

See these and other new and improved Fosdick machines



With the NEW Fosdick Jig Borer

Dial Dimensions Direct from Print . . . to .0001"



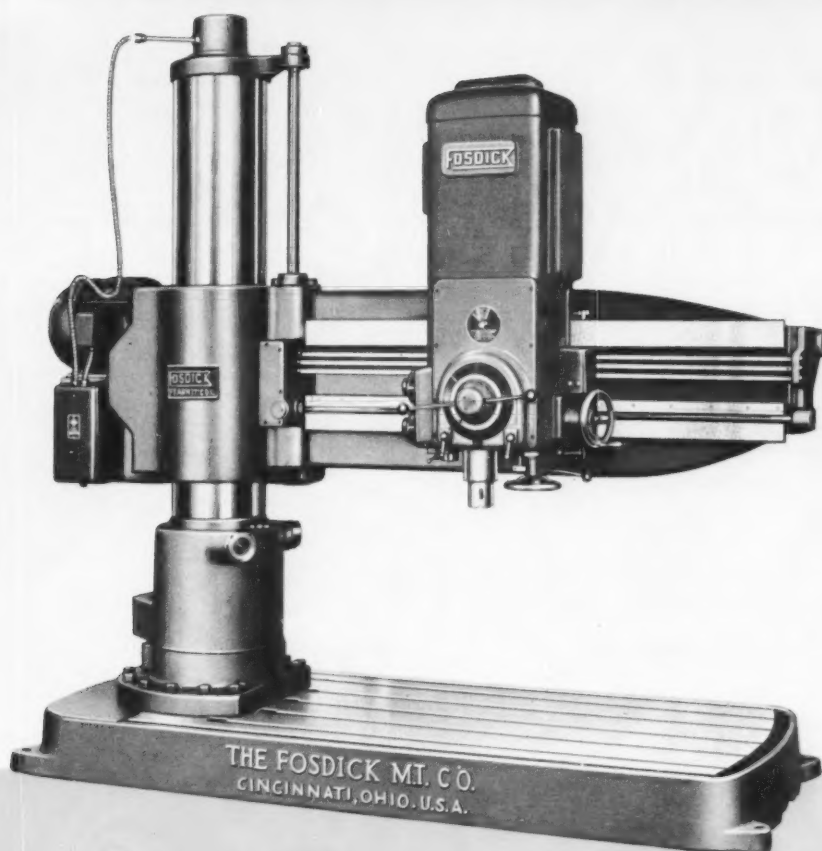
Like the scores of Fosdick Jig Borers in plants throughout the U. S., this new machine will perform consistently to $\pm .0001''$. . . in measured table and saddle position as well as hole size.

With Direct Dimension Measuring, dimensions from the blueprint are simply set on direct-reading drum dials, one for longitudinal, the other for transverse position. Once dials are set, press the positioning button. Table and saddle will automatically position to the dimensions set on the dials. We guarantee accuracy of $\pm .0001''$.

These and other advancements make this new Fosdick the outstanding Jig Borer in the business.

See it at the Show!

See why at the Show - - It pays



With the **NEW FOSMATIC Radial Drill**

Pre-select feeds and speeds... drill with ease and precision

All the new features needed by the modern machine shop have been designed into the new Fomatic Radial Drill. Pre-selected speeds and feeds for a new degree of speed and operator convenience. Spindle speeds up to 3000 rpm to suit today's high-speed requirements. Engineering refinements throughout to give you the rigidity you need for fast precision drilling.

Features of the Fomatic include — Easy feed and speed shifting simply by raising the spindle control lever slightly in its

neutral position. Feed is engaged and disengaged by push buttons on the feed levers. Spindle reverse speed 40% faster than forward speed to make tapping faster. New spindle bearing mounting for greater rigidity and accuracy. New counterbalance gives equal tension on spindle regardless of position. New combined arm-elevating and head-traverse lever. New high-strength arm design. 36 speeds, 18 feeds. 4' to 8' arms, 13" to 19" columns. And many more valuable features.

See it at the Show!

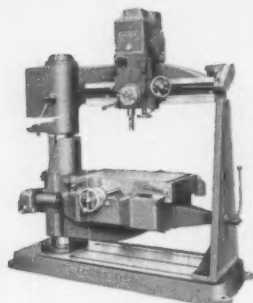
to get a proposal from Fosdick

See why at the Show --

Booth 1402



It pays to get a proposal from Fosdick



New Sensitive Radial Layout Machine

Doubles as a Radial Drill!

Fosdick's new Layout Machine combines a high-precision jig borer table with a Sensitive Radial Drill. An outboard support connects the end of the arm to the base for extra rigidity. Layouts can be made on the 24" x 42" table to accuracy of within .001".

Power traverse quickly moves both the table crosswise and the head along the arm. Measurements are obtained by means of graduated dials. Convert the machine for radial drill use simply by disconnecting or removing the outboard support.

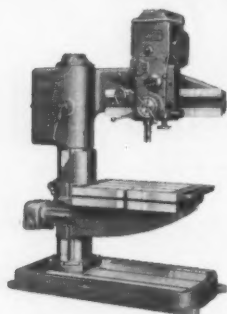
See it at the Show!

New Automatic-Positioning Jig Grinder



The only machine of its kind in the world! Combines the unique Moore jig grinding head with the exclusive Fosdick automatic positioning table, has capacity of 22" x 42" x 27" height. Grinds jigs, dies, punches, templates and machine parts. Infinite grinding speeds from 12,000 to 60,000 rpm. Offers contour, chop and slot grinding. Table positions work automatically to $\pm .0001$ ".

See it at the Show!

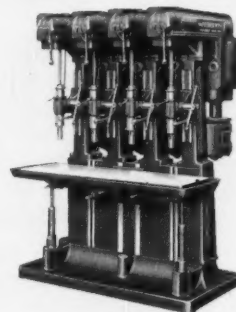


Sensitive Radial Drill

Combines the features of Upright and Sensitive drills — rigidity, compactness and convenient table height — with the capacity and flexibility of a Radial. Fixed-height arm swings 360°; adjustable-height table swings 360°. Work is placed either on table or base; convenient controls always at same height. 9 speeds, 60 to 1200 rpm or 175 to 3500 rpm. 4 feeds, .004 to .020 or .002 to .010 ipr. 12" column, 3' or 4' arms.

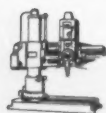
See it at the Show!

Sensitive Drills



For economical production of small drilled parts; built for a long life of trouble-free performance. 1½ or 3 hp models. Multiple spindles up to 6. Six or nine spindle speeds, 55 to 900, 110 to 1800, 225 to 1800 or 220 to 3600 rpm. Standard electric motor. Adjustable head on column. Reversing motor control for tapping. Direct reading speed levers. Table elevating lever in front.

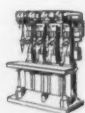
See them at the Show!



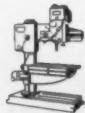
Radial Drills



Jig Borers



Sensitive and
Upright Drills



Sensitive
Radial Drills



Automatic
Positioning Machines

THE FOSDICK MACHINE TOOL CO., CINCINNATI 23, OHIO

FOSDICK

designed to work **TOGETHER...**

as closely as a nut and bolt



the truly
MODERN COOLANT
and
MODERN MACHINE TOOLS



A prominent Machine Tool Builder recently surveyed forty-three metal working plants in five major cities. The survey included questions on machine tools, cutting tools, coolants and metal cutting research.

On the subject of coolants, since heretofore, there had been found little difference in effects on tool life by various conventional water soluble coolants, the vast majority questioned were primarily concerned with the AGE OLD maintenance problems caused by rusting, gumming and stink.

TRIM, a truly MODERN COOLANT, not only eliminates these basic problems, but also provides the higher heat transfer and chemical action which allows modern machining to pay off at HIGHER PRODUCTION RATES and LOWER COSTS.

Write for the new brochure containing a very useful 56-page booklet on cutting and grinding procedures.
LONGER TOOL LIFE . . . HIGHER RATE OF PRODUCTION . . . NO RUST . . . NO GUMMING . . . NO STINK!

TRIM . . . A PRODUCT OF MASTER CHEMICAL CORPORATION • 13 HURON STREET • TOLEDO 1, OHIO

See THE OLIVER LINE in Action

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NEW



Introducing the- Oliver HAND OPERATED FACE MILL CUTTER GRINDER

Shown for the first time at the Machine Tool Show is this machine designed to overcome present difficulties in grinding close pitch carbide face mills. The new Oliver is easy to set up . . . grinds tungsten-carbide and high speed work effortlessly. The motor driven grinding wheel spindle can be tilted either side of center up to 90 degrees and is locked into a fixed position while grinding. Error due to wheel wear is eliminated . . . a diamond dresser provided directly beneath the grinding wheel enables the wheel to be dressed as it wears down. Cutters may be ground on the face, periphery and corner angles without changing or resetting the lip rest.

CAPACITY: Face Mills 4" to 24" in diameter.

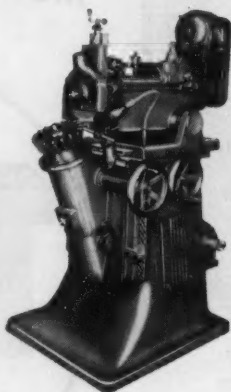
"ARC" RADIUS GRINDER

The OLIVER No. 2 ARC RADIUS GRINDER designed for the accurate sharpening of Face Mills, Channel Cutters, Slotting Cutters and other precision cutters. It is built to meet the need for cutters with true round corners, the OLIVER ARC accurately grinds a round corner on a cutter simply and easily . . . blending it into the face and periphery with one continuous movement of the grinding wheel. Sharpening many forms and variations, the ARC is used extensively in the aircraft industry where a radius on cutters is of major importance.

FACE MILLS: Channel Cutters, Slotting Cutters.



AUTOMATIC FACE MILL GRINDER



The OLIVER HYDRAULIC AUTOMATIC FACE MILL GRINDER accurately grinds a greater number of milling cutters per hour than ordinary face mill grinders. Extremely simple to run . . . one man can operate several machines at a time.

The efficient Oliver automatically indexes and machine grinds each tooth in succession until the entire cutter is completely and accurately ground. Accuracy is assured . . . Cutters may be ground to .0002" without difficulty . . . at each stroke the wheel passes over a fixed diamond compensating for wheel wear, enabling tungsten-carbide inserts to be easily and rapidly ground to any degree of accuracy and quality of surface. If desired it can be furnished with a hydraulic feed to the work spindle which provides a fully automatic grinder.

CAPACITY: 3 sizes; 6" to 16", 8" to 18", 10" to 21".

20" TEMPLATE (controlled) TOOL BIT GRINDER

The OLIVER TOOL BIT GRINDER utilizes a controlled and numbered template which makes possible the grinding of single point cutting tools in a single operation on one machine. It grinds single point tools in a fraction of the time required by other methods . . . and reduces grinding time on tungsten-carbide work as much as 100% to 500% (using a notched wheel, with water on the wheel and through the wheel, makes this possible).

CAPACITY: Tool bits up to 1½" wide x 1¾" high. Special shapes and sizes may be handled in special holders.



at

OLIVER
ADRIAN

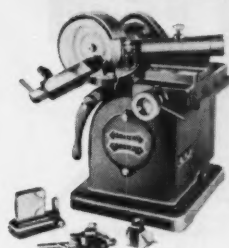
**LOOK OVER THE
TEN OLIVERS
IN OPERATION — BOOTH 604**

**THE
MACHINE TOOL
SHOW**

CHICAGO, ILL.
SEPT. 6-17, 1955
INTERNATIONAL AMPHITHEATRE



No. 21 Bench Type DRILL POINTER



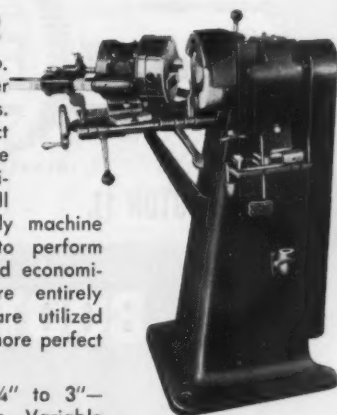
Designed especially for grinding small drills, this Bench Type DRILL POINTER is built to the same standards as the No. 510. The drill is located in a jig before placing in the machine. A positive setup is provided and a uniform grind on each lip is assured. A definite setting will give the desired grind each time with absolute accuracy and uniformity. Special attachments are available for grinding unusual special purpose points, left hand drills and many other difficult grinding jobs.

CAPACITY: $\frac{1}{2}$ " to $\frac{1}{2}$ " 2-lip right hand. Special collet available down to a No. 57 drill.

No. 510 DRILL POINTER

Drills ground on an OLIVER No. 510 last from 2 to 3 times longer than ordinary hand ground drills. Machine ground to a perfect balance, Oliver ground drills are scientifically correct and theoretically perfect—each lip of the drill does equal work. It consistently machine grinds every individual drill to perform accurately . . . rapidly . . . and economically. Grinding operations are entirely automatic. Fixed mechanisms are utilized which assure the production of more perfect holes and longer drill life.

CAPACITY: Right hand drills $\frac{1}{4}$ " to 3"—2-3-4 flute. Variable clearances. Variable point angles.



DRILL POINT THINNER

Completely universal and easy to set up and operate, this Oliver assures the reclaiming of drills otherwise useless, at a low cost. It corrects structural faults in drills . . . web off-center . . . cutting edges out of index . . . and too thick webs. It also may be used for cutting off the points of drills and thinning left hand drills.

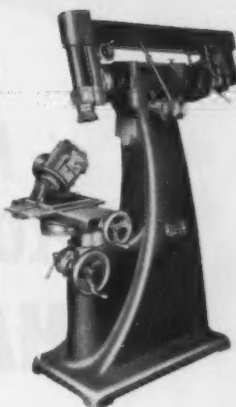
CAPACITY: Two lip drills $\frac{1}{8}$ " to 3" in diameter.



HEAVY DUTY ACE Universal Tool and Cutter Grinder

The ACE is easy to set up . . . needs only a small amount of floor space . . . requires less outlay of dollars. Its simplicity of design and operation makes economy of motion and fast grinding certain. The economical OLIVER ACE handles a wider variety of cutters than ordinary cutter grinders . . . performs the toughest grinding jobs with ease.

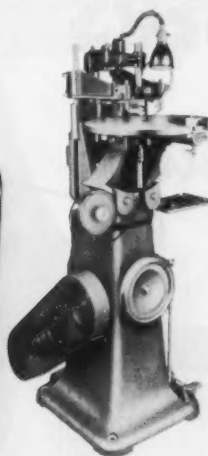
FACE MILLS up to 15"—also, slab mills • slitting saws • dovetail cutters • angular cutters • double angle cutters • Fellows helical cutters • reamers • taper reamers • production gashing and carbide tipped circular wood saws.



HEAVY DUTY DIE MAKING MACHINE

The Oliver is unsurpassed for accuracy on Dies, Production Filing, Experimental Work, Metal Patterns, Cams, Gages and Templates. It consistently effects cost reductions of as much as 60% through simplifying sawing, filing and lapping operations . . . saves time . . . is easy to operate . . . does not require skilled labor.

CAPACITY: Saws and files tool steel up to 3" thick. SIX SPEEDS. Has variable strokes up to 5" with hydraulic feed.



SP-2 Pedestal Model DIE MAKING MACHINE

Here is a two speed Pedestal Model that accurately saws and files tool steel up to 1" thick. For accurate work on dies, gages, cams, templates, stripper plates, production filing, etc.

Recommended for all types of sawing and filing operations. Table tilts in three directions—equipped with $\frac{1}{4}$ HP motor.



MACHINE TOOLS
by OLIVER include:

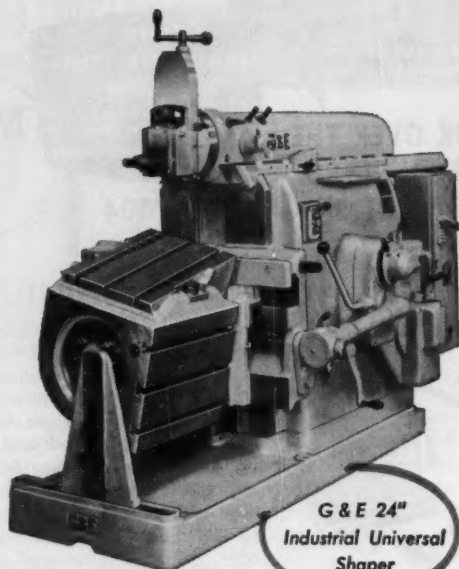
AUTOMATIC DRILL GRINDERS
TOOL & CUTTER GRINDERS
DRILL POINT THINNERS
TEMPLATE TOOL GRINDERS
FACE MILL GRINDERS
DIE MAKING MACHINES

OLIVER INSTRUMENT CO.

1410 E. MAUMEE • ADRIAN, MICHIGAN

SEE
the **NEWEST**
DEVELOPMENTS *in*
SHAPERS
and
GEAR
HOBBERS

Exhibited by



G & E 24"
 Industrial Universal
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INCORPORATED

IRVINGTON 11,

N. J., U. S. A.



G & E 10HQ Hoblique
 Helical Gear Hobbing
 Machine

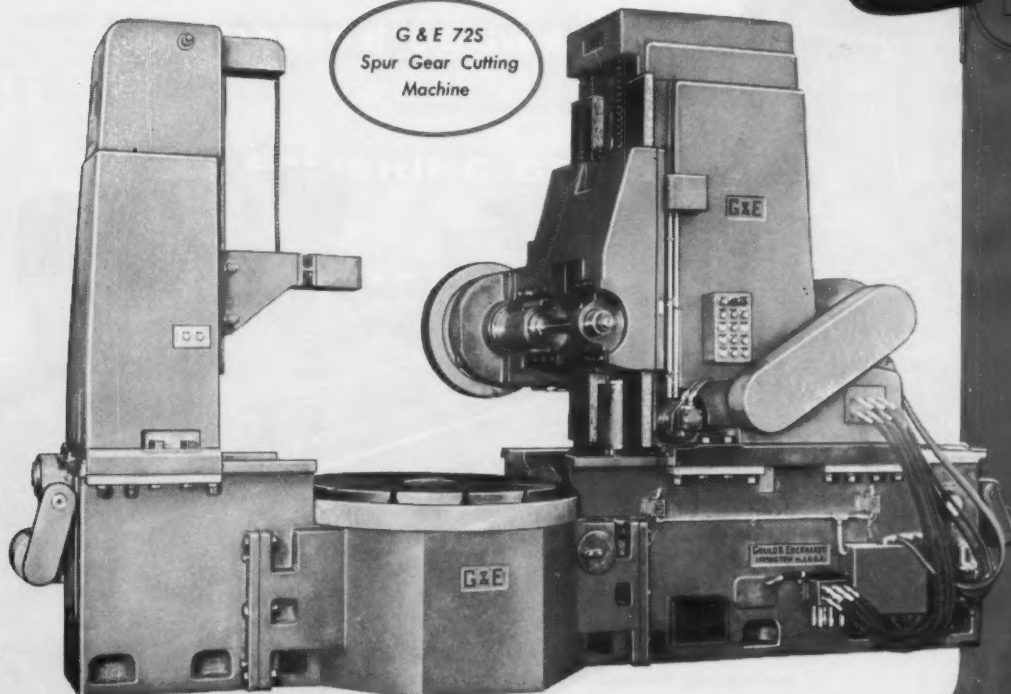
in **BOOTH 1424**

An Invitation

We cordially invite you to visit our display of the latest developments in shapers and gear hobbing machines at the Show. If you are unable to attend, write us for new catalogs describing the machines in which you are interested. We welcome the opportunity to serve you.



G & E 48H
High-speed Universal
Gear Hobbing
Machine



G & E 72S
Spur Gear Cutting
Machine

THE
MACHINE TOOL
SHOW
CHICAGO, ILL.
SEPT. 8-17, 1955
INTERNATIONAL AMPHITHEATRE



G & E

AGAIN . . . LATHE LEADERSHIP FROM LODGE & SHIPLEY

15

NEW

PowerTurn LATHES

Exclusive new —

Computing

HEAD

. . . fast, fool-proof indication
of correct speed settings!

Centri-trol
CONTROLS

. . . all controls conveniently
grouped, distinctively shaped!

Turning problems into production is a built-in specialty of these New Lodge & Shipley POWERTURN Lathes. From headstock to tailstock and down to the floor POWERTURN Lathes are designed to facilitate turning to new, higher levels of profitable operation.

The many new features add importantly to Lodge & Shipley Lathe ability to produce more at lower cost.

New POWERTURN Lathes are produced in 13", 16", and 20" Standard Engine, Toolmaker, Gap, Manufacturing and COPYMATIC types.

Write for new literature on POWERTURN Lathes newest and best from *The Lodge & Shipley Co., 3055 Colerain Ave., Cincinnati 25, Ohio.*

Features

- Positive brake
- Micrometer carriage dial
- Direct-reading cross and topslide dials
- Built-in horsepower ammeter
- Greater swing over cross slide
- New chip and coolant pan
- Redesigned feed levers
- Square base compound rest



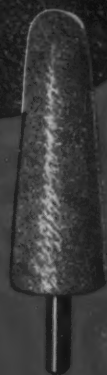
See it NOW . . . See it at THE MACHINE TOOL SHOW!
September 6-17. Booth 502

for



GRINDING WHEELS

MOUNTED POINTS

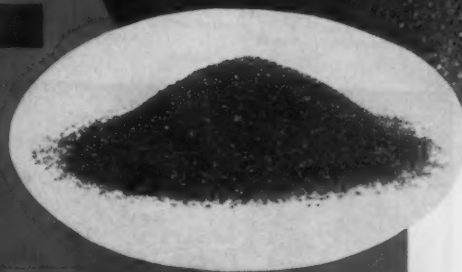


ABRASIVE SEGMENTS



POLISHING GRAIN

**SIMONDS
ABRASIVE CO.**



at your service with extra service

What's your idea of service? Here's ours! A distributor network geared to help you over production crises as well as in your everyday grinding problems. Free consultation with our field engineers to search out new economies for you. Close teletype communication between our main plant and branches to expedite your orders. New mass production equipment to give you 3 to 4 weeks delivery on small diameter wheels . . . plus the extra product service inherent in Simonds manufacture. If this concept of service coincides with yours, get it by specifying Simonds Abrasive products.

SIMONDS ABRASIVE COMPANY • PHILADELPHIA 37, PA.

Branch Warehouses: Boston, Detroit, Chicago, Portland, San Francisco • Distributors in Principal Cities
Division of Simonds Saw and Steel Co., Fitchburg, Mass. • Other Simonds Companies: Simonds Steel Mills, Lockport, N. Y.,
Simonds Canada Saw Co., Ltd., Montreal, Quebec, Lion Grinding Wheels Div., Brockville, Ont. and
Simonds Canada Abrasive Co., Ltd., Arvida, Quebec



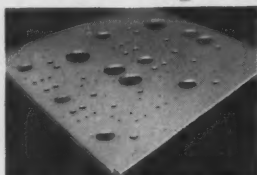
Announcing

PAY-AS-YOU-PRODUCE PLAN

WITH

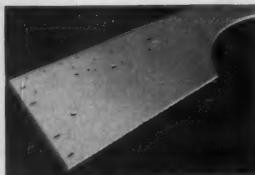
WALES Fabricators

Time Payments PAID OUT OF THESE SAVINGS!



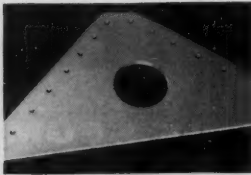
ELECTRONIC CHASSIS 12-1/2" x 11-1/2", with 118 holes and 4 notches was completed including setup in only 32.45 minutes and subsequent pieces in

6.44 minutes.



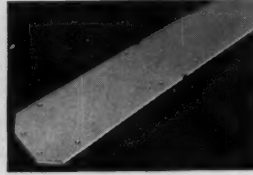
A part of FARM EQUIPMENT, 72-1/2" x 22" with 32 holes and nibbled cut out was finished including setup in only 12.01 minutes, subsequent pieces in

2.32 minutes.



AN AIRCRAFT part 7-1/2" x 4-1/2" with 15 holes and 1 notch was produced including setup in only 3.52 minutes and subsequent pieces in only

54 seconds.



Part of an ELECTRIC REFRIGERATOR, 39-7/8" x 8-1/2" with 10 holes and 4 notches was fabricated including setup in only 5.61 minutes and subsequent pieces in only

37 seconds.



Check the difference between your present methods of production to make the above parts and the typical astounding time studies produced on Wales Fabricators, *the only machine of its kind.*

Designed for rapid interchangeability of punches and dies for hole punching, notching and nibbling operations, Wales Fabricators permit working direct from blueprints or operation sheets . . . *no templates required.*

Write today for complete information on Wales Fabricator Pay-As-You-Produce Plan that more than pays for itself out of savings.

WALES-STRIPPIT CORPORATION

George F. Wales, Chairman
575 Payne Avenue, North Tonawanda, N. Y.

(Between Buffalo and Niagara Falls)

Wales-Strippit of Canada, Ltd., Hamilton, Ontario

Specialists in Punching and Notching Equipment

New! DAKE Elec-draulic PRESS

... COMPLETELY NEW, with advantages never before available in a low cost shop press, including:

RAPID RAM APPROACH

Automatically changes to power stroke when it contacts the work.

VARIABLE RAM SPEED

From zero to maximum under fingertip control.

MOVABLE WORKHEAD

Self-contained — easy to center over the work. Workhead can be purchased separately.

MODERN DESIGN

All operating controls at convenient working height.

Standard Equipment consists of, 1) structural steel frame, 2) self-contained hydraulic workhead, 3) pressure gauge, 4) safety valve, 5) table-lifting device, 6) two table plates, 7) two V-blocks, 8) round nose for pressing, and 9) V-ram nose for straightening.

SPECIFICATIONS

| Press | Capacity Tons | Ram Speed Inches/Min. | | Motor HP | Motor RPM | Overall Height in. | Floor Space in. | Travel of Table in. | Travel of Ram in. | Width between Uprights in. | Width between Table Channels | Maximum Distance Ram to Table, in. | Shipping Weight, lbs. |
|-------|------------------|--------------------------|-------|-------------|--------------|--------------------------|-----------------------|------------------------------|----------------------------|-------------------------------------|---------------------------------------|---|-----------------------------|
| | | Adv. | Press | | | | | | | | | | |
| 5-050 | 50 | 40 | 7 | 2 | 1800 | 86 | 36 x 43 1/2 | 35 | 10 | 32 3/4 | 7 1/4 | 40 | 1320 |
| 5-075 | 75 | 28 | 5 | 2 | 1800 | 90 | 36 x 55 1/2 | 32 | 10 | 44 | 8 1/4 | 36 | 1650 |
| 5-150 | 150 | 16 | 2 3/4 | 2 | 1800 | 102 | 42 x 66 | 20 | 16 | 48 | 12 1/4 | 25 | 3000 |



CONSTRUCTION AND OPERATING FEATURES

FRAME — Rigid arc-welded steel, reinforced throughout.

WORKHEAD — Roller-mounted on needle bearings to permit moving quickly to any point along top channels for off-center work. Locking screws provided.

MOTOR — Constant-running . . . not necessary to start and stop for each operation.

SAFETY VALVE — protects against overload.

RAM — returns to starting position instantly when release valve is opened.

STROKE INDICATOR — for accurate ram control.

**DAKE
PRESSES**

DAKE CORPORATION

604 Seventh St. • Grand Haven, Mich.

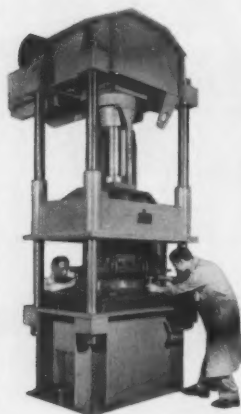
See "In Action" Display — Booth 105 — Chicago Coliseum Machinery Show

DAKE PRESSES

MEAN

**SPEED
ACCURACY
ECONOMY**

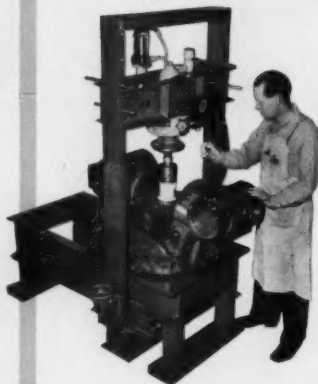
DIE TRY-OUT PRESSES



Save time and avoid tie-up of production presses when developing dies, testing completed dies, and making sample runs.

These are hydraulic presses, electrically operated. Available with or without cushion, in capacities from 25 to 300 tons. Ask for Bulletin 330.

MOVABLE FRAME PRESSES



The easy way to press irregular, awkward, heavy, or hard-to-handle parts . . . place them on the worktable with crane or hoist, and center 25 to 300 tons of hydraulic power over the work. The press workhead is easily moved anywhere over the entire table area. Air or electric power. Ask for Bulletin 269B.

GAP TYPE PRESSES



Dake Gap Type Presses are made in two types—one for straightening and one for pressing. Eleven sizes are made in each type—22 models in all—ranging from 15 to 300 tons capacity. All are hydraulically operated and have a self-contained power unit with positive displacement pump. Ask for Bulletin 299.

CUSTOM-ENGINEERED PRESSES



Dake engineers are prepared to help in the development and construction of special presses for unusual or difficult jobs. Their wide experience, and the exceptional facilities at their command, enable them to adapt standard presses or design special presses that will bring substantial manufacturing economies. Write and tell us your problem.

DAKE CORPORATION • 604 Seventh St., Grand Haven, Mich.



Arbor Presses



Hand Hydraulic



Power Hydraulic

**DAKE
PRESSES**



Guided Platen



Gap Type Presses

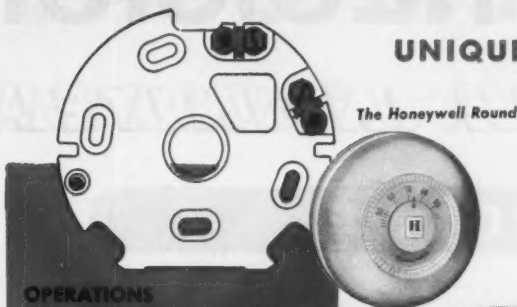


Movable Frame

See "In Action" Display — Booth 105 — Chicago Coliseum Machinery Show

Bodine CASE HISTORY NO. 40

UNIQUE TOOLING SAVES 90% LABOR



The Honeywell Round

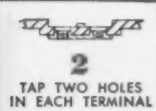
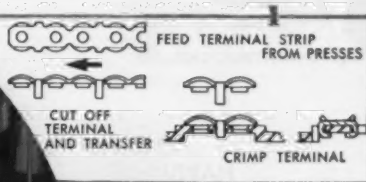
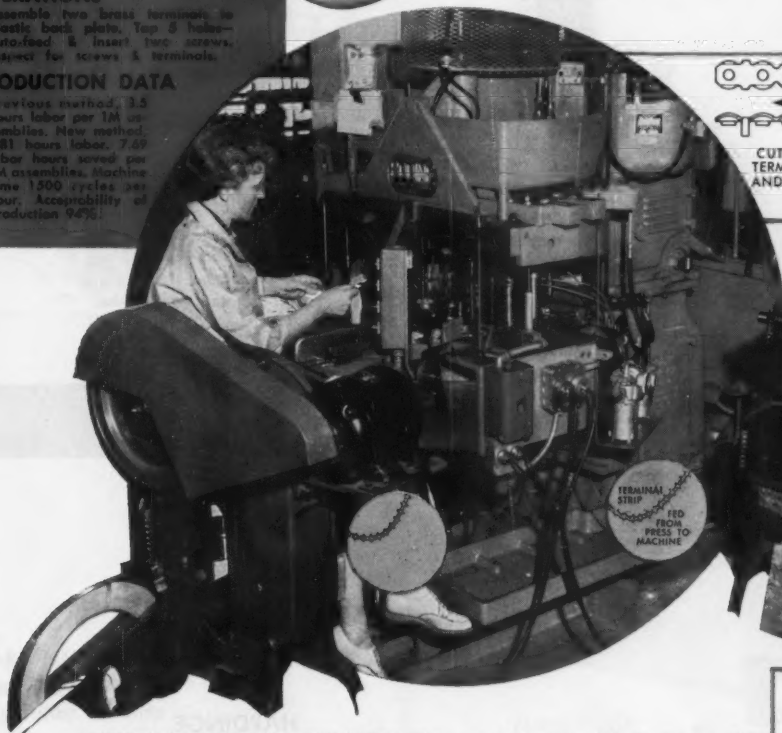
OPERATIONS

Assemble two brass terminals to plastic back plate, tap & insert, auto-feed & insert two screws. Inspect for screws & terminals.

PRODUCTION DATA

Previous method, 3.5 hours labor per 1M assemblies. New method, 0.81 hours labor, 7.69 labor hours saved per 1M assemblies. Machine time 1500 cycles per hour. Acceptability of production 90%.

Minneapolis-Honeywell's attractive room thermostat depends upon this unique tooling set-up for economical volume production of the plastic back plate terminal block assembly shown at left. Labor hours have been reduced to about ONE TENTH of previous operations, thanks to this Bodine 42-30 Machine. It's just one example of the versatility of Bodine machines as they lend themselves for special tooling to meet specific job requirements.



UNUSUAL TOOLING FEATURES: This complete assembly is now made in one cycle of a Bodine 42-30 Machine. The two presses stamping the terminal blanks are coupled to and cycled by the machine, feeding stampings continuously as shown. Terminals are cut-off, inserted and formed over at station one. Back plates are magazine fed. Operator's functions are largely limited to keeping back plate magazine filled and replenishing coils of brass stock on presses.

At end of operation, two inspection probes, advanced from below, test for properly filled screw terminal holes, automatically discard rejects.

With today's demand for cost-saving through grouping of assembly operations, Bodine's extensive experience in the field will prove profitably useful. We invite inquiries. Send your ideas and samples for analysis to Dept. M-9.

*"You Can't Meet Tomorrow's Competition
With Yesterday's Machine Tools."*

You're invited to visit us at the National Machine Tool Show, International Amphitheatre, Chicago, Ill., Sept. 6-17 inclusive. Booth No. 209.

THE

Bodine

CORPORATION

BRIDGEPORT CONNECTICUT

AUTOMATIC DIAL TYPE DRILLING, MILLING,
TAPPING, AND SCREW INSERTING MACHINES

68D88

HARDINGE
ELMIRA, N.Y.

1955 PRECISION

WITH INFINITELY

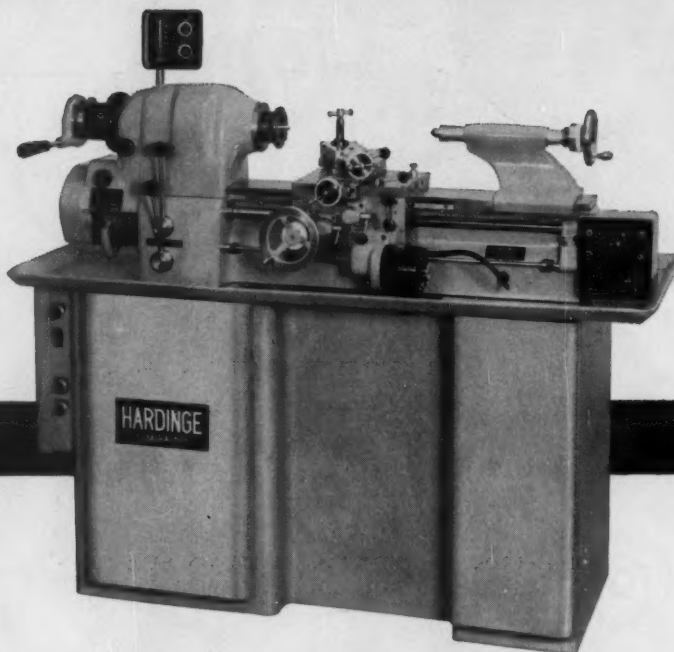
for TOOL ROOMS



see **HARDINGE** catalog
in Sweet's

MACHINE TOOL CATALOG

HARDINGE
Model HLV
Tool Room Lathe



HARDINGE
Model UM
Universal Milling Machine
Also Model TM Plain Milling
Machine



HARDINGE
Model DV 59
Lathe



Write for Bulletins

"PERFORMANCE HAS ESTABLISHED LEADERSHIP FOR HARDINGE"

PERFORMANCE

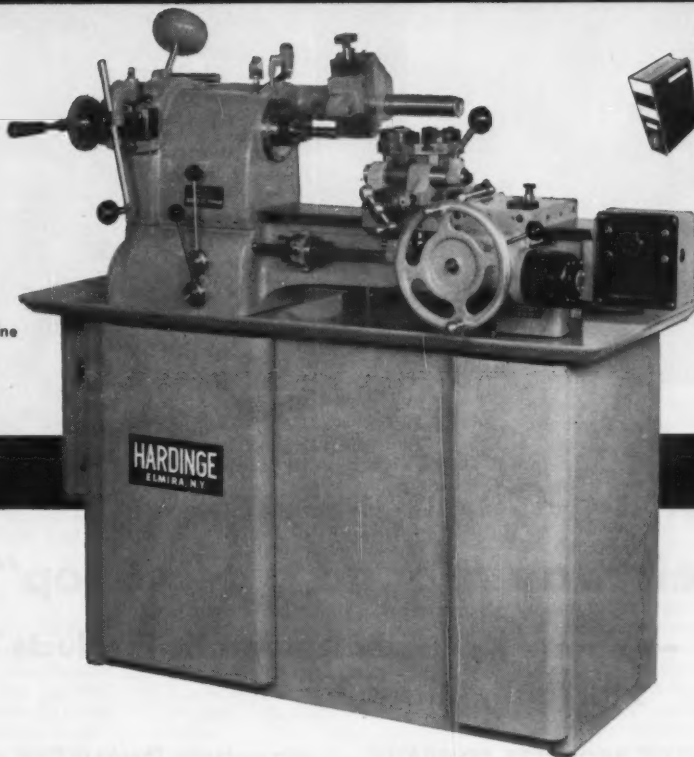
HARDINGE
ELMIRA, N.Y.

VARIABLE SPEEDS

for PRODUCTION DEPARTMENTS

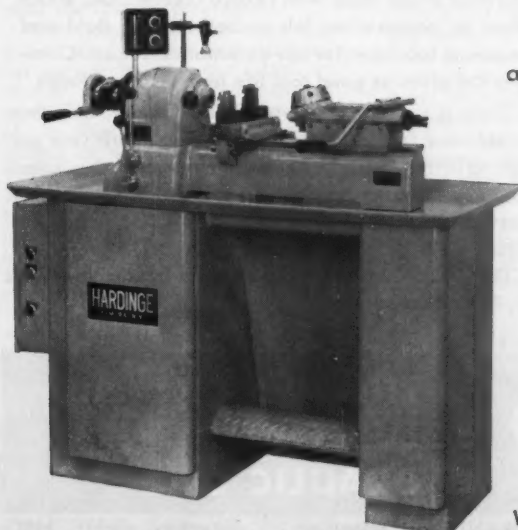
**HARDINGE
Model HCT
Chucking Machine
with Production
Threading Head**

Also Model HC Chucking Machine
without
Production Threading Head

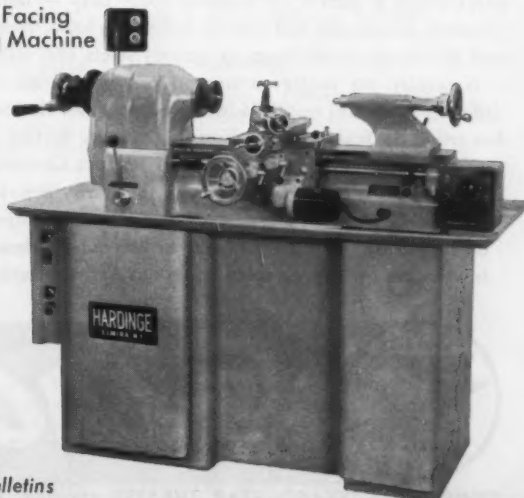


see **HARDINGE** catalog
in Sweet's
MACHINE TOOL CATALOG

**HARDINGE
Model DSM 59
Second Operation Machine**

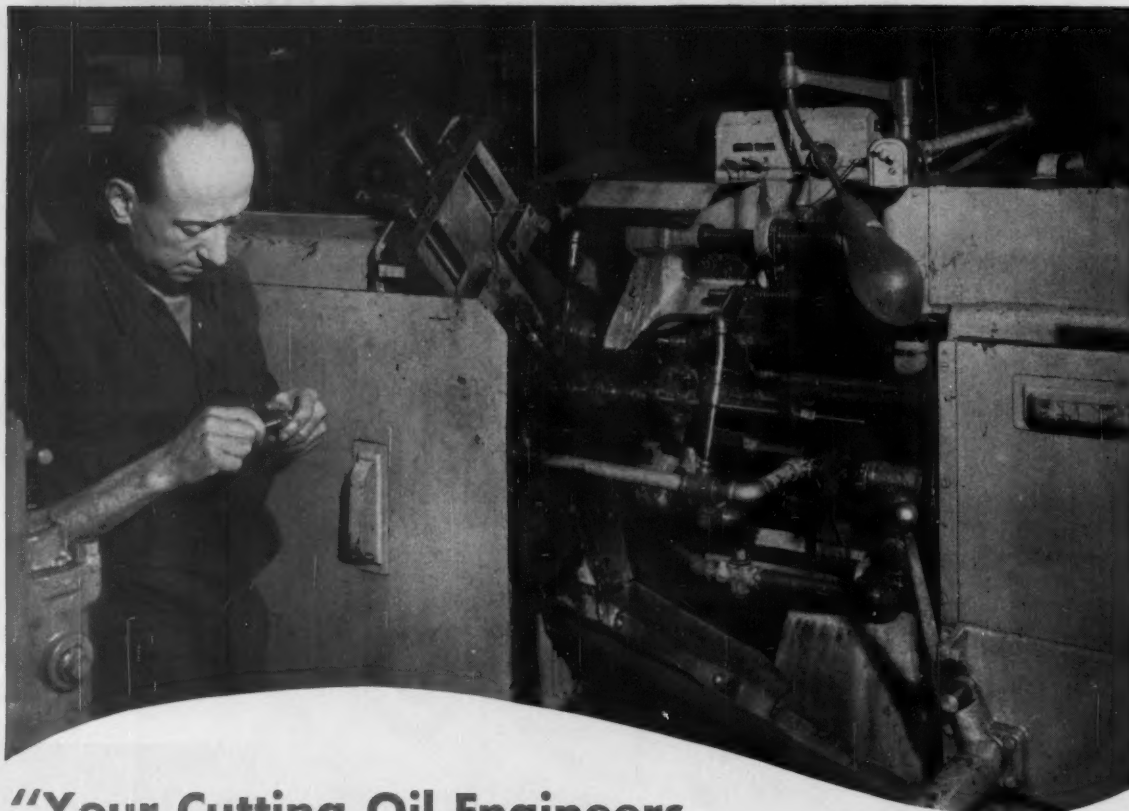


**HARDINGE
Model TFB
Turning, Facing
and Boring Machine**



Write for Bulletins

HARDINGE BROTHERS, INC., ELMIRA, N. Y.



"Your Cutting Oil Engineers know their way around a Job Shop"

**—reports Kennedy Automatic Products Co.,
Marshall, Michigan**

KENNEDY AUTOMATIC PRODUCTS COMPANY is known throughout Michigan for its fine job work. The plant keeps a variety of machine tools busy — lathes, grinders, automatics and others—and works brass, copper and aluminum in addition to various steels and alloys.

Naturally, no single cutting oil can handle all this different work and metal. However, since 1947, Kennedy has relied on Texaco Lubrication Engineering Service for guidance—with highly satisfactory results. Says Kennedy—

"Your cutting oil engineers know their way around a job shop. Their recommendations for the proper oil to use and the proper way to use it have been invaluable in helping us to solve our many machin-

ing problems. Thanks to them we have been able to do most of our work with Texaco Cleartex Oil, which does an outstanding job as both cutting fluid and machine lubricant for our automatics. Texaco Cleartex Oil gives us good tool life and excellent finish."

There is a complete line of *Texaco Cutting, Grinding, Soluble and Hydraulic Oils* to help you do all your machining better, faster, and at lower cost. Let Texaco Lubrication Engineering Service help you use them profitably. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, New York.



TEXACO

**CUTTING, GRINDING,
SOLUBLE AND
HYDRAULIC OILS**

TUNE IN... TEXACO STAR THEATER starring JIMMY DURANTE on television... Saturday nights, NBC.



By LORING F. OVERMAN

Accomplishments of the Eighty-Fourth Congress

AS seemed likely when the evenly divided eighty-fourth Congress convened in January of this year, its 96 Senators and 435 Congressmen were understandably preoccupied with politics. As a result, only the very minimum of essential bills made the long trek from hopper to White House desk to become completed legislation.

Meanwhile, at press time for this column, among the major measures which had been signed into law were those providing for increased anti-trust penalties, a debt limit increase, doctors' draft, foreign aid authorization, pay raises for federal and postal employees, and extension of reciprocal trade agreements. Appropriations bills passed provided funds for the Department of Agriculture, Commerce, Government Matters, Independent Offices, Interior Department, State-Justice-Judiciary Departments, and Treasury-Post Office Departments.

Defense—\$31,800,000,000

Awaiting only the President's signature was one measure of particular interest to machinery people—the appropriation bill for the national defense program. Passed by both houses and approved by conference committees, the measure provided \$31,800,000,000 to maintain and expand the defense program.

With Russia boasting of its "superior" air force, and seven top scientists warning the world that an atomic war means extinction of most of the human race, the question of keeping the nation prepared proved too dangerous to permit involvement in politics. Instead, the Senate Banking Committee observed that demands of the defense mobilization program "will continue to be great for an indefinite time, thus making necessary the extension of the Defense Production Act."

The House Armed Services committee heard the same story from Brigadier General J. B. Medaris, Chief of the Army Ordnance Industrial Division. General Medaris urged for fiscal 1956 a \$697,000,000 program for the Defense Department for defense plant expansion, industrial equipment maintenance, and lay-away. As usual, there were official questions about the figure of \$100,000,000 for long lead-time machine tools in fiscal 1956. However, the validity of the estimate was ac-

cepted after General Medaris explained that it represents specific projects for tools possessing interchangeable characteristics that could be used by more than one Service. The General cited as an example 24-inch boring mills having a lead-time of eighteen months to two years.

Foreign Aid—\$3,200,000,000

How the foreign aid program affects the machinery industries is illustrated in a recent \$100,000,000 distribution. The distribution was made for the period ending June 30 by the Foreign Operations Administration, predecessor to the International Corporation Administration. The latter organization has just been granted \$3,200,000,000 for fiscal 1956. In the distribution of \$100,000,000 in twenty-one countries by FOA, the following entries appear:

To Spain—\$1,850,000 for iron and steel mill materials and products, and ferro-alloys; \$3,687,000 also for generators and motors; electrical apparatus, motor vehicles; construction, mining, and conveying equipment; iron and steel mill materials; metal-working machinery; and industrial machinery; \$179,000 for machine tools.

To Cambodia—\$1,200,000 for industrial machinery.

To Israel—\$29,812 for industrial machinery.

To Turkey—\$2,891,000 for industrial machinery and spare parts, \$1,000,000 for spare parts for engines and turbines; \$200,000 for spare parts for water pumping equipment; \$525,000 for construction, mining, and conveying equipment, and spare parts.

The foregoing items are from a mere \$100,000,000 appropriation. The \$3,200,000,000 total for 1956 may include some interesting dividends for machinery industries.

Ten Years Hence

In looking ahead to the next session of Congress, it seems certain that members of both houses will make some grandstand plays involving the Taft-Hartley law, tax cuts for individuals, liberalizing of social security, and possibly extension of coverage under the Fair Labor Standards Act.

Each party will make a try at vote-influencing legislation. Regard-

less of whether the Congressional accomplishments of next year are to one's liking, the long look ahead reveals an interesting and favorable picture. President Eisenhower has frequently predicted, without amplification, that the United States should be looking forward to a \$500,000,000,000 a year economy. The economists point out that this is a most conservative figure—based on a total population of 186,000,000 and a working force of 70,000,000 persons.

Business As Usual

Meanwhile—between elections and between decades—Washington is planning for steady expansion of its defense facilities, and of the economy in general. The Government's policy of offering tax inducements to encourage the building of new production facilities has been under review for some time. Present plans of the Office of Defense Mobilization are to take the middle of the road policy, limiting rapid amortization and other inducement systems to three possible situations: one would grant federal aid only if it is clear that present capacity is inadequate to produce military and essential civilian requirements; another would consider whether a producer is willing to locate a plant in a chronic labor-surplus area; and a third would be to encourage dispersal of an industry to a less vulnerable location.

Washington Briefs

New torsion testing machines meeting requirements of the Army Ordnance Corps are described in a report released by the Office of Technical Services. The new tester produces shear fractures and permits accurate determination and recording of energy and torque values. Copies of the twenty-two-page report entitled "Improved Method of Testing Torsion Impact" (PB 111613) are available at 75 cents each from the Office of Technical Services, Commerce Department, Washington 25, D. C.

The fine for conviction in anti-trust cases may now be as much as \$50,000, instead of \$5,000. Both houses of Congress passed the bill authorizing such a change, and the President affixed his signature. The higher maximum has long been sought by enforcement agencies.



**"PERFORMANCE HAS ESTABLISHED
LEADERSHIP FOR HARDINGE"**

See pages 174-175

Show Time in Chicago

THE most momentous event in American industrial history, so far as exhibitions of interest to the metal-working branches of the industry are concerned, is at hand. This month, from the sixth day to the seventeenth, there will be in simultaneous operation the Machine Tool Show at the Chicago Amphitheatre, the Production Engineering Show at the Navy Pier, and the Metal-working Machinery and Equipment Exposition at the Coliseum. On exhibition at these Shows will be the latest types of machine tools, cutters, gaging devices, coolants, cleaning compounds, and other manufacturing equipment and accessories. It has been estimated that at least 300 railroad cars and 1000 trucks were used to bring the exhibits to the Machine Tool Show alone.

One of the reasons this event will transcend all previous shows is because the technological advances incorporated in machine tools in the few years that have passed since the Korean conflict are significantly greater than those of the previous twenty years. The new machines are the full fruit of research, invention, and development programs that have been carried out since the hectic production days of the second World War.

New concepts in machine design that will insure increased productive capacity and accuracy, and at the same time, a reduction in manual labor and manufacturing costs, will be unfolded. It has been predicted that the

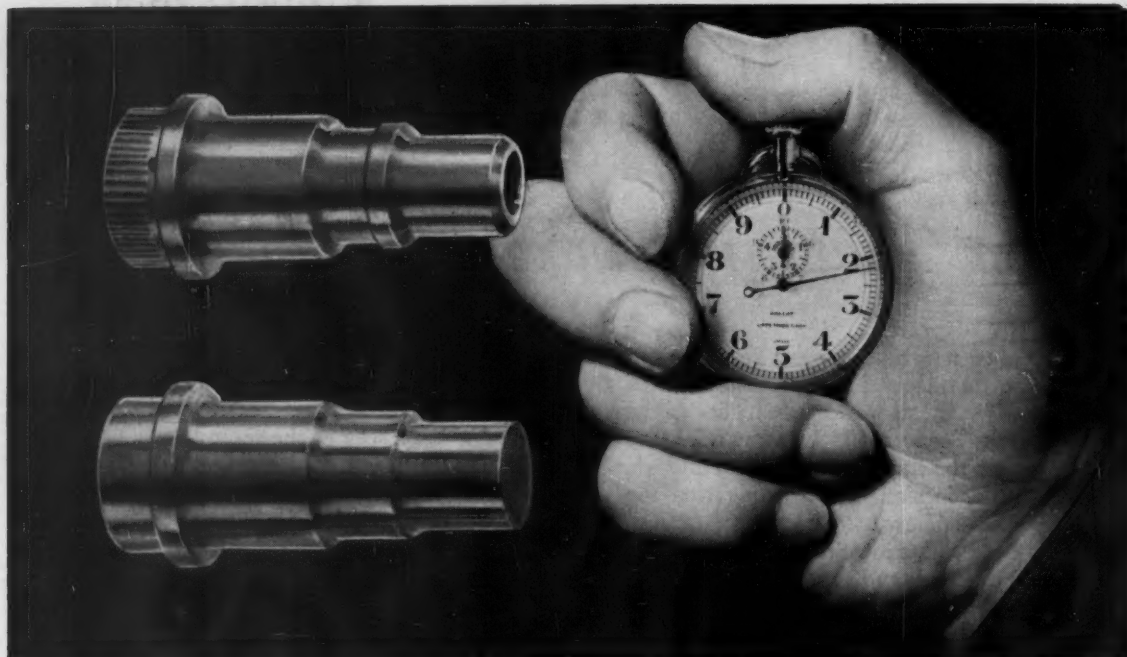
time is close at hand when production men will talk in millionths of an inch as easily as they formerly mentioned thousandths. The equipment to be seen at the three Shows for the manufacture and gaging of metal products is a step toward that achievement. Automation equipment will be in abundance, but there will also be many outstanding machines intended for operation as individual units. The exhibits will range in weight from a few pounds to many tons.

The companies that will exhibit at the Machine Tool Show, particularly, are spending huge sums of money in order to bring their latest models to the attention of future users. It costs real money to transport heavy equipment from the factory to a Show booth and there operate the equipment on typical shop jobs. In most instances the money will undoubtedly be well spent because the estimated attendance is at least 200,000 top executives and production men of manufacturing concerns. Visitors will be certain to take advantage of the opportunity of buying new equipment that will out-perform obsolete machinery now operating in their plants on a less economical basis than would be possible with the latest models.

Few men responsible for manufacturing programs in metal-working plants or for the selection of equipment to carry out such programs can afford to stay away from Chicago during the first two weeks of this month.

Charles O. Herb

EDITOR



Finished 50% faster Using Ledloy from Ryerson

By the time the B-1113 piece was finished, you'd be halfway through a second Ledloy piece. Such greater speeds and feeds are possible with Ledloy because Ledloy contains a *built-in lubricant* which substantially reduces the friction between the steel and the cutting tool.

That built-in lubricant is *lead*—so finely dispersed through this free-machining, open-hearth steel that you can't see it with a microscope. The addition of this small percentage (.15-.35) of lead has no effect on the mechanical properties of the steel EXCEPT to greatly increase machinability.

Ryerson Ledloy machines up to 50% faster than B-1113 . . . tool life is extended as much as 200% . . . and net savings of 25% and more are effected. And Ledloy machines to an unusually clean, smooth finish—case hardens effectively

—and bends, crimps, swedges or rivets easily.

Ask your Ryerson representative for the facts about Ledloy or write us direct for engineering data. Ryerson was the first to stock Ledloy and today your nearby Ryerson plant carries the world's largest stocks of Ledloy rounds, squares and hexagons in a wide range of sizes for immediate shipment when you call.

PRINCIPAL PRODUCTS

CARBON STEEL BARS—Hot rolled & cold finished

ALLOYS—Hot rolled, cold finished, heat treated

STAINLESS—Allegheny bars, plates, sheets, tubes, etc.

TUBING—Seamless & welded, mechanical & boiler tubes

STRUCTURALS—Channels, angles, beams, etc.

PLATES—Many types including Inland 4-Way Safety Plate

SHEETS—Hot & cold rolled, many types & coatings

MACHINERY & TOOLS—For metal fabrication




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180—MACHINERY, September, 1955

For more information on products advertised, use Inquiry Card, page 325

CHICAGO

An aerial, black and white photograph of the Chicago skyline, showing a dense cluster of skyscrapers and buildings, with the city extending towards the horizon.

METALWORKING'S BIGGEST DISPLAY

MACHINERY

Show Number

Vol. 62

No. 1

September, 1955

Unprecedented attendance is expected at the three Shows to be held in Chicago from September 6 to 17. There will be so much to see that visitors will be sure to miss some equipment of vital importance to them unless their trips to the exhibits are planned ahead of time. The following pages constitute a preview of several hundred new machines, tools, gages, and other equipment that will be on view for the first time. The supplement to this issue presents floor plans of the three Shows and locates the booths of the many exhibitors. With this advance information on hand, Show visitors can plan to utilize their time to greatest advantage.



The Pace

By M. A. HOLLENGREEN

President and General Manager
Landis Tool Co., Waynesboro, Pa.
and President of the
National Machine Tool Builders' Association

WE live in an age of acceleration. Each year research and invention appears to be moving faster than they did the year before. The momentum in recent years is incredible by comparison with the past.

This trend will be dramatically demonstrated at the Machine Tool Show to be held at the International Amphitheatre in Chicago, September 6 to 17. New models there to be exhibited will make many of the machines still in operation in America's metal-working plants look like relics of a bygone age. The fact is that more advances in machine tool design have been made in the last five years than in any previous quarter century of the industry's history.

These new models have been in the making for some time. Principles employed were originally developed some years ago. What is new is the amazing extent to which these principles have been developed and applied to practical use. The principle of the transfer machine, for example, is being extended into new fields. The cutting capacity of carbide tools is now being matched by cutting power. Spindle speeds have advanced beyond all previous experience. Electronic controls have found a multiplicity of applications. I could go on and on. The thing to do is come to the Show and see these things for yourself. These revolutionary changes in machine tool design and performance are part and

parcel of the technological acceleration which is taking place throughout all industry. For example, jet-plane engines demand a degree of machining accuracy that was never required before. So machine tools were developed which could hold this accuracy. But conversely, the development of such machine tools made possible the manufacture of the jet engine. Such machining accuracy required finer methods of measurement, and so new and better gages were developed. But the gages were essential to the functioning of the machine tools and therefore to the manufacture of the jet engine.

The new machines to be exhibited at the Show have resulted partly from research in the machinability of various alloys, and partly from a realization of the necessity for providing American manufacturers, faced with the competitive conditions of today, with machines that can do more work faster and at lower cost. Machine tools can now be driven to the very limit of a cutting tool's potentialities with relation to the metal to be machined, and modern controls can gage speeds and feeds accordingly. This makes for maximum productivity.

Because of the remarkable strides in the field of electronic and hydraulic controls, the operator of many of the machine tools of today no longer does the work. The job of the operator is merely that of directing and regulating the work of the

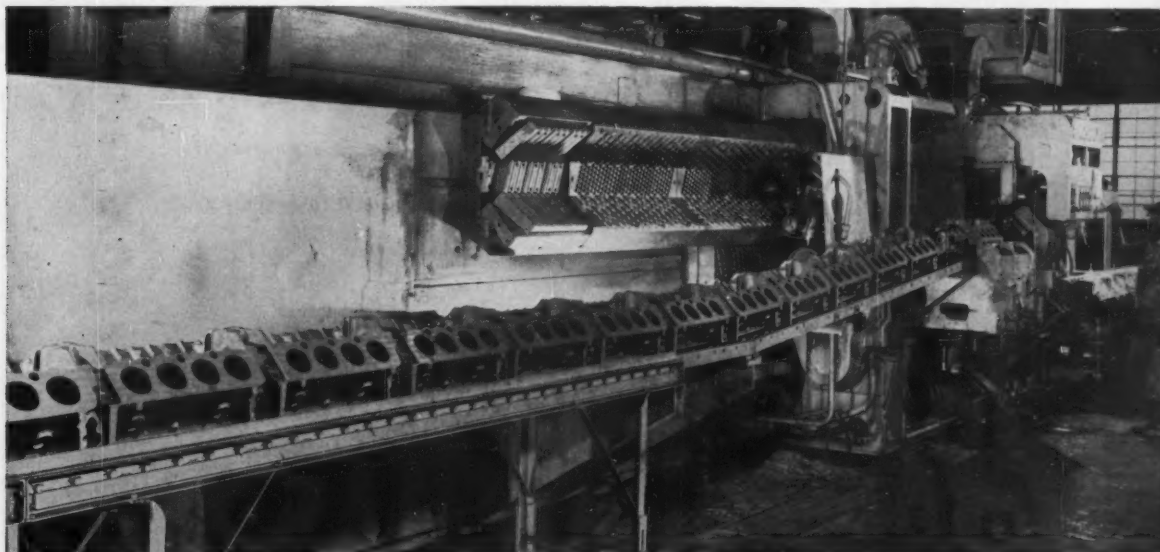
of Tomorrow

machine through various control buttons and devices. The operation is not always "automatic" in the complete sense of the term. Often it is necessary to adapt the operation of the machine to the performance of the particular work on hand. However, once the operator has set the controls, the machine operates automatically. Some important results obtained from such equipment include a rate of productivity not determined by the operator, but built into the machine itself, and an accuracy not determined by the skill of the operator, but by controls built into the machine.

Capability to machine parts to extreme accuracy, the controls designed to insure it, and the remarkable new devices for work measurement, will be greatly in evidence at the Show. The aircraft industry first presented, as a matter of necessity, the demand for much narrower tolerances than were required in the past. However, as better machine tool controls and performance made such tolerances possible, it was discovered throughout the industrial field that greater machining accuracy opened up new avenues for the development of both civilian and national defense products. The new machines will produce to the close tolerances which will inevitably be required by future products and more demanding customers.

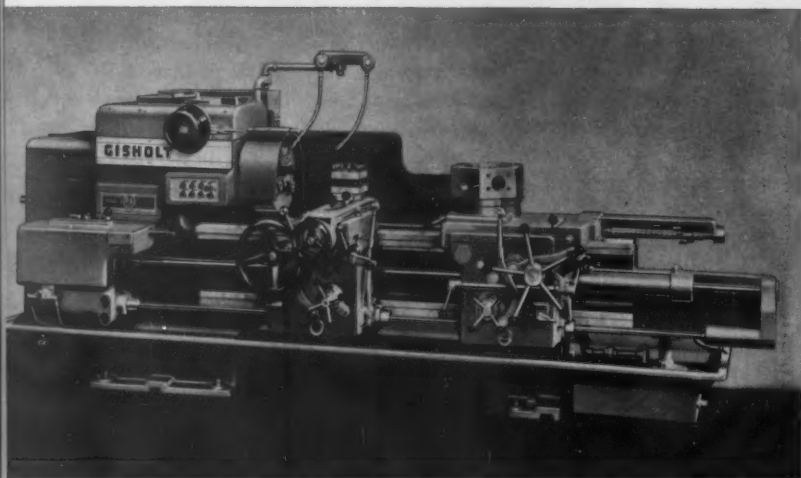
There is a perpetual argument in the metal-working industry as to the virtues of special-purpose machine tools as contrasted to general-purpose machines. The builders of both types have been equally active in designing new equipment. And so, the visitor to the Show will see on exhibit and in operation, examples of transfer machines, working on quantity repetitive jobs, capable of cost reductions which seem almost incredible by comparison with successive individual operations. But he will also see general-purpose machine tools equipped with new attachments and devices which enable them to multiply their former productivity. Such general-purpose machines will undoubtedly offer stiff competition to transfer machines and other single-purpose mass production equipment because of their flexibility and adaptability to different types of work.

Throughout the entire metal-working field new and better products can actually be transformed from drawings into reality only by the functioning of machine tools. It is machine tools, therefore, that determine to a major extent the rate of acceleration in industrial progress. In short—machine tools set the pace of productivity. What will be on display at the Chicago Machine Tool Show will, in fact, set the industrial pace of tomorrow.



Preview of New Equipment

Three spectacular exhibitions concurrently staged in Chicago this month offer the metal-working industry its greatest assemblage of machine tools and shop accessories. From September 6 to 17, inclusive, the Machine Tool Show, sponsored by the National Machine Tool Builders' Association, will be held at the International



Gisholt "Masterline" Series of Machine Tools

Machine Tool Show, Booth 1413

Entire lines of new and improved machine tools, numbering twenty-five in all, will be demonstrated by Gisholt Machine Co., Madison, Wis. Included will be a

new line of ram type turret lathes consisting of the No. 3 "Electram," which features a Gisholt-Weatherhead chuck that power indexes the work-piece without stop-

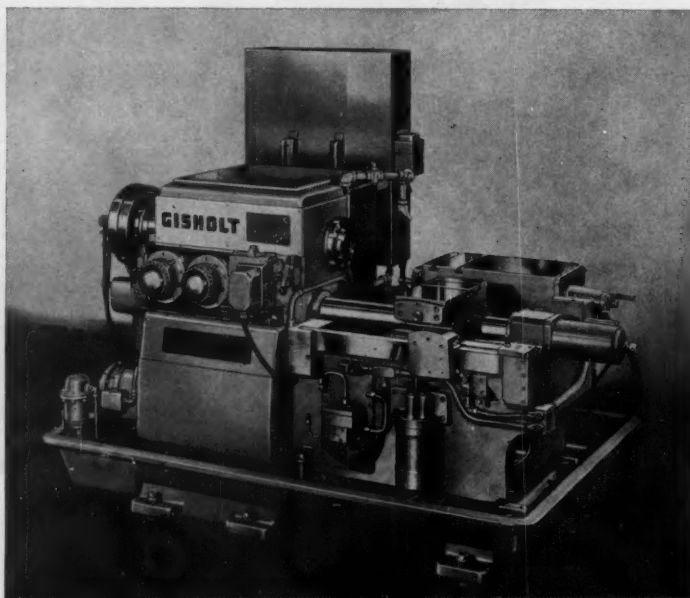
ping the spindle; the No. 4 ram, having a hydraulically operated bar feed and collet chuck; the No. 5 ram, featuring a hydraulic "Jetracer" on the cross-slide; and the "Big Bore" No. 5 ram, handling 4 1/2-inch diameter aluminum-alloy bar stock.

A line of saddle type turret lathes designed for heavy-duty turning consists of the 1L saddle, Fig. 1, the 2L saddle, featuring a Jetracer template unit mounted on a bridge type cross-slide; the 3L saddle, a twenty-four speed machine with a fixed-center hexagon turret and a full-length lead-screw; the 4L saddle, having a cross-feeding hexagon turret; and the 5L saddle equipped with a remote speed selector and spindle controls as well as a compound cross-slide with power angular feed.

Five new automatic production lathes for single-spindle chucking will be exhibited. These include the No. 12 horizontal; the No. 12 vertical; the No. 12 automatic, Fig. 2, incorporating automatic handling, gaging and tool setting; the No. 24 automatic, Fig. 3, fea-

Fig. 1. (Above) One of five improved Gisholt "Masterline" saddle type turret lathes having a swing capacity ranging from 19 1/2 inches on the 1L to 36 1/2 inches on the 5L

Fig. 2. (Right) Masterline No. 12 automatic production lathe providing single-spindle chucking



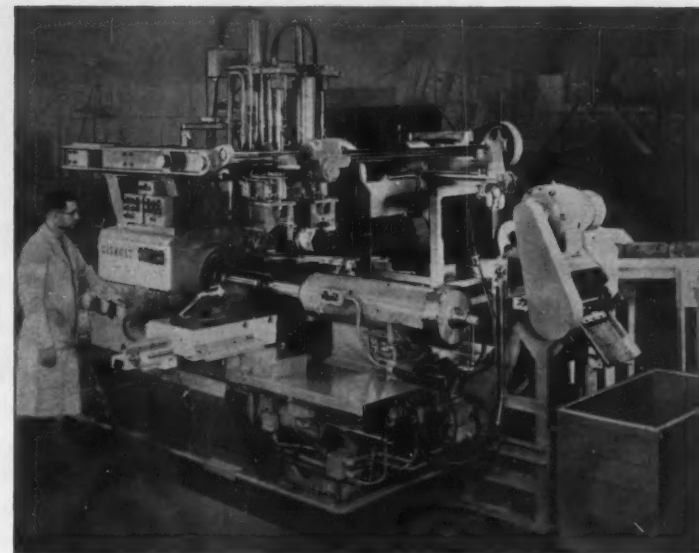
to be Seen at the Shows

Amphitheatre; the Production Engineering Show, at the Navy Pier; and the Metalworking Machinery and Equipment Exposition, at the Coliseum. In this number of MACHINERY, the major portion of editorial coverage is devoted to a preview of many new and redesigned items of equipment making their initial appearances

turing complete push-button operation for loading and unloading from conveyors and also automatic cycling; and the "Simplimatic." Also to be demonstrated are the automatic No. 5 ram type turret lathe and the 2F "Fastermatic" automatic turret lathe with independent front and rear slides.

The latest in Superfinishing equipment will be used on typical jobs. Four machines and one attachment are to be exhibited: the No. 52A general-purpose machine which has an adjustable automatic cycle for job-lot work; the No. 54 two-spindle machine that handles two different parts simultaneously; the No. 79 bearing-race machine, Fig. 4; the No. 81 valve-tappet machine that provides automatic cycling; and the No. 3 attachment that mounts on existing lathes. The lathe Superfinishing attachment can be obtained in four sizes.

Four models of "Dynetric" balancing machines will also be displayed. These are the 1SB which has an integral drill that makes the necessary corrections in units that can be read directly from a



meter; the 31S floor model which has two sets of work supports to permit handling a wide variety of work; the 1SU1 vertical model, Fig. 5, which has a correction drill

unit incorporating automatic chip removal and facilities for accuracy testing; and, finally, the type 4U floor model. This floor model balancing machine will be demon-

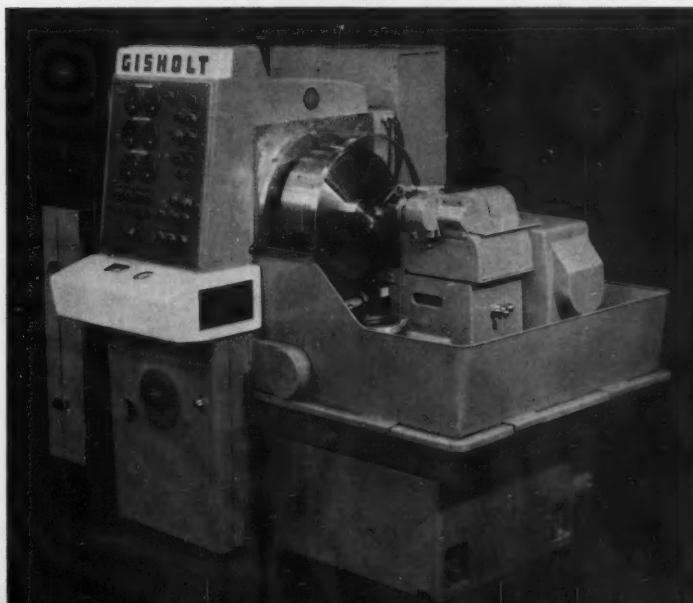


Fig. 3. (Above) Full automation facilities are incorporated in the Gisholt No. 24 automatic production lathe

Fig. 4. (Left) Completely automatic cycling is built into this Masterline No. 79 Superfinishing machine which accommodates both inner and outer races for roller bearings

Preview of the Chicago Shows

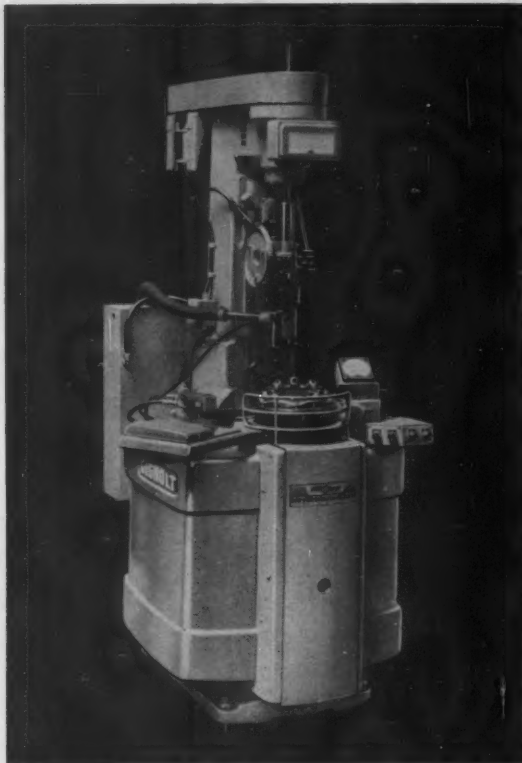


Fig. 5. Gisholt vertical balancing machine measures amount and location of static unbalance

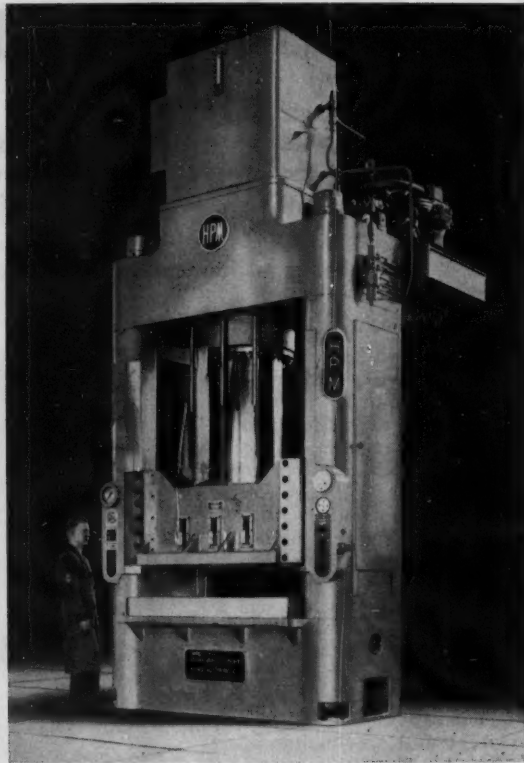


Fig. 1. H-P-M Fastraverse press contains improved hydraulic control system

strated with a 645-pound test rotor operating at a speed of 300 R.P.M. Any unbalance in the test rotor, causing movements of as little as 25 micro-inches at the bearings, can be conveniently and quickly measured and located.

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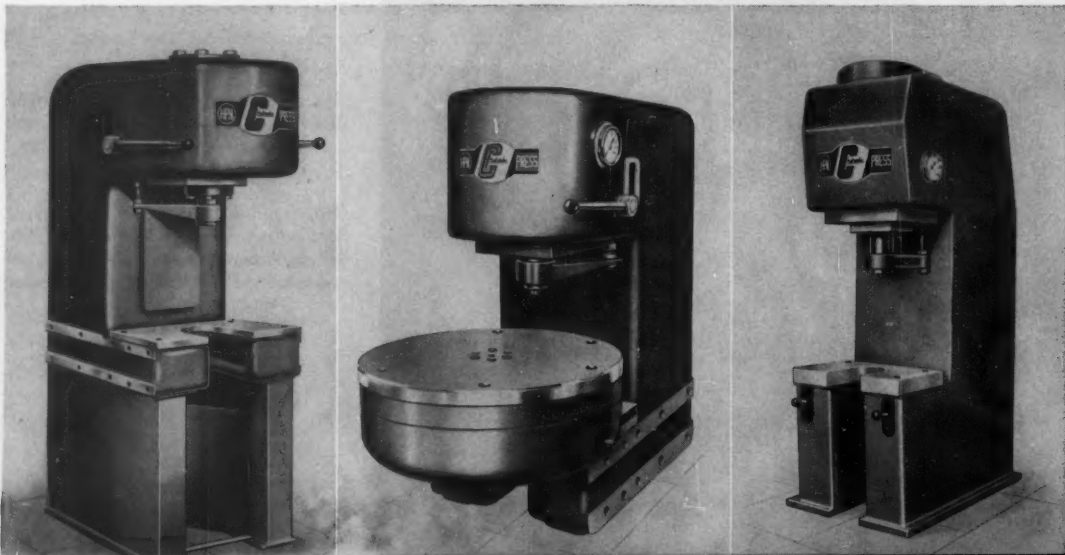
H-P-M Blank-Holder and C-Frame Presses

Machine Tool Show, Booth 718

Several developments with wide application for many different industries will be displayed by the Hydraulic Press Mfg. Co., Mount

Gilead, Ohio. The exhibit will include a 400-ton Fastraverse blank-holder press, Fig. 1, with an improved hydraulic control system.

Fig. 2. Three members of the new C-frame line: (Left) a bench model; (Center) a bench model with an index-table; and (Right) a floor model



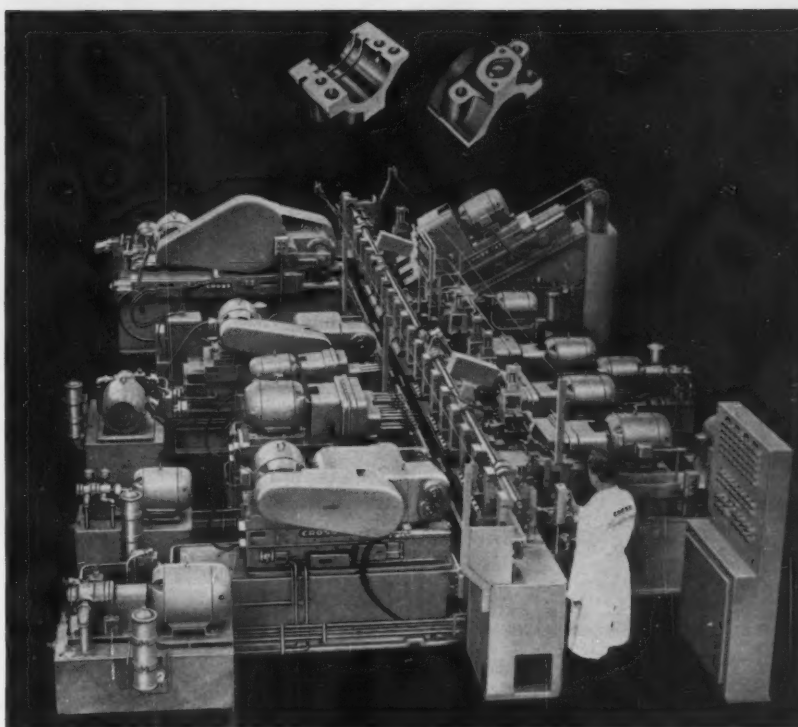
Preview of the Chicago Shows

By providing quick and precise response of all press actions, the system assures low die-setting time and high production. The die-setting means is particularly unique in that it provides accurate manual control of both speed and direction of ram travel by using a conveniently located hand crank.

A new line of hydraulic C-frame presses will be seen in operation. The line includes eleven sizes, from 2 to 200 tons, and for each model there is a choice of control-valve assemblies. A high-speed differential circuit allows the operator to "inch" the ram up or down when setting dies. The open frame design eliminates encumbrances within the tooling area and provides a maximum amount of room.

The C-frame presses can be furnished with index-tables, available in three sizes. These tables serve either as carriers of parts or material to a central work station, or as work-fixtures with complete dies installed at various stations. In operation, oil from the press power unit is diverted to the table circuit at the conclusion of each ram cycle. Three of the new presses are illustrated in Fig. 2.

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Cross Transfer-matic for machining crankshaft main-bearing caps

Hydra-Feed Tracer Lathe

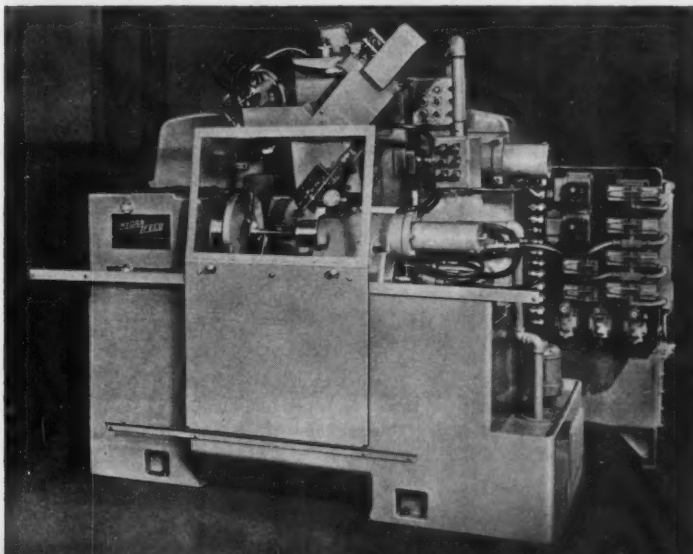
Machine Tool Show, Booth 301

The new tracer lathe of the Hydra-Feed Machine Tool Corporation, Ferndale, Mich., will be shown turning forgings for automobiles. A feature of the lathe is the location of the tracer slide and

template on a top carriage above the spindle, thus minimizing the possibility of errors from accumulated dirt or chips. The lathe demonstrated will be equipped with an auxiliary carriage to perform a facing operation. An automatic chip-removal unit is provided in an opening in the rear of the bed.

Indicate Item 103 on postcard, page 325

Production lathe with top carriage tracer developed by the Hydra-Feed Machine Tool Corporation



Cross Transfer-matic for Bearing Caps

Machine Tool Show, Booth 1118

Crankshaft main-bearing caps will be machined at the rate of 450 per hour on a Transfer-matic operating in the display of The Cross Company, Detroit, Mich. This machine handles the work in the form of a three-cap cluster for a series of drilling, chamfering, reaming, tapping, and milling operations. As a final operation, the cluster is sawed into individual pieces. There are nineteen stations, including one for loading and seven for inspecting. The work is indexed from station to station by an automatic transfer mechanism. Features of the machine include gravity-operated cam clamping, tandem drive for locating pins, individual lead-screw feed for tapping, and hydraulic feed and rapid traverse.

Cross will also feature its control unit for programming tool changes. "Toolometers" incorporated in the unit automatically stop the transfer machine when cutters grow dull. Stand-by cutters are pre-set to gages.

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Preview of the Chicago Shows

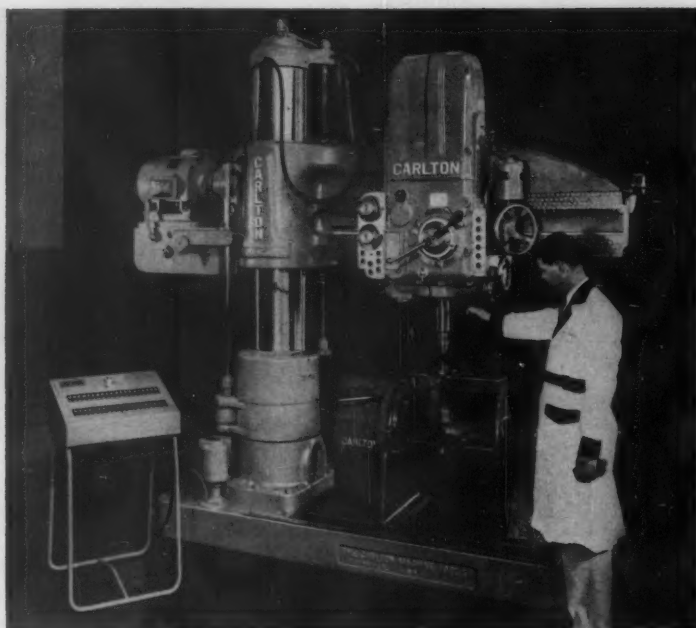


Fig. 1. Carlton radial drill equipped with pre-selector and programmer

Pre-Selectors and Programmers for Radial Drills

Machine Tool Show, Booth 919

Radial drills on exhibit by the Carlton Machine Tool Co., Cincinnati, Ohio, carry pre-selecting and programming devices. A No. 4A drilling machine is illustrated in Fig. 1. The pre-selector, seen mounted on the head in Fig. 2, permits the speed and feed of the spindle to be set up for a subsequent operation while the machine is running. Then, at the completion of the cut, the new speed-feed combination is auto-

matically obtained by depressing a push-button.

The programmer, see Fig. 3, is a further refinement making it possible to select in advance all the various speed-feed combinations required for an entire series of drilling operations. It is a console connected by cable to the pre-selector on the head. There are two rows of cylinders (one for speed, the other for feed) and an indexing dial. When setting up a

job, the desired speed-feed combinations are "tuned in" according to the sequence in which they are to be performed. A shift to a new combination is made by depressing the pre-selector button.

In practice, a production engineering department of a company can study a drawing, and determine the sequence of drilling operations and the correct speed and feed for each. This data is recorded on a routing sheet or blueprint and is transferred to the programming console. The one illustrated can be set for as many as twenty different sequential operations. (A thirty-operation console is also available.) Any combination of the thirty-six speeds and eighteen feeds of the machine is possible. Carlton radial drills can be obtained with conventional manual shift, with pre-selector, or with pre-selector and programmer.

Indicate Item 105 on postcard, page 325

Safe-Torque Tap Drivers

Navy Pier, Booth 164

Scully-Jones & Co., Chicago, Ill., will show improved "Safe-Torque" tap drivers which will be demonstrated in a drill press set-up for bottom tapping with a 3/8-16 hand tap at a speed of 1800 R.P.M. New Safe-Torque nut runners will also be demonstrated in air and electric power tools.

A "Toolitrol" board and pre-setting tools incorporated in a new method for controlling at-the-machine problems of pre-setting, storing, and changing tools will also be exhibited.

Indicate Item 106 on postcard, page 325



Fig. 2. Pre-selector on head of Carlton radial drill

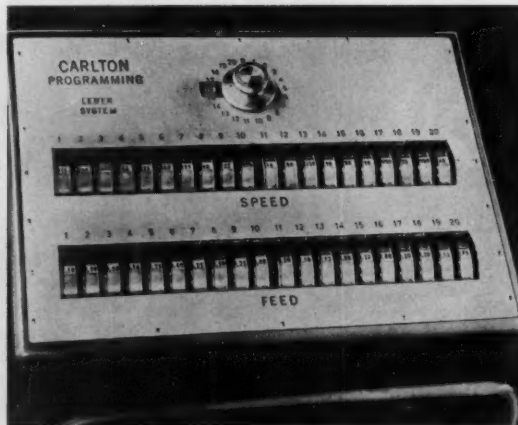


Fig. 3. A close-up view of the programming console

Preview of the Chicago Shows

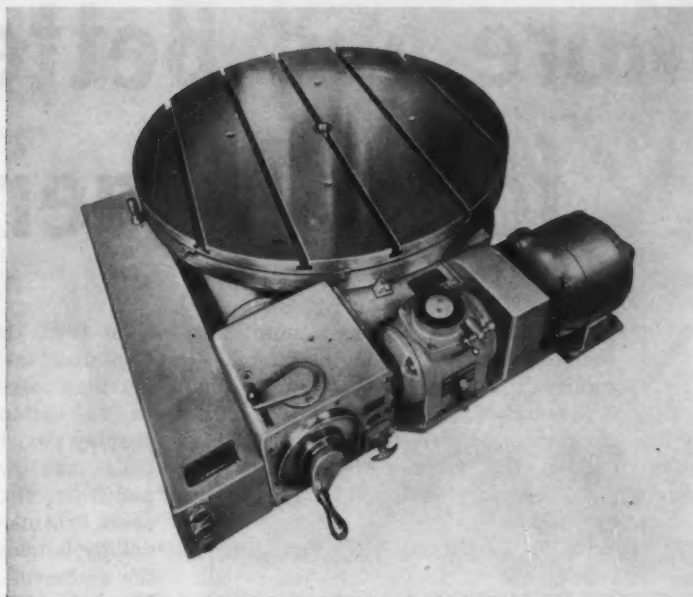
Knight Power-Feed Rotary Table

Machine Tool Show, Booth 418

Virtually any vertical or horizontal milling machine can be adapted for power circular milling or indexing with the new power-feed rotary table to be exhibited by W. B. Knight Machinery Co., 3920 W. Pine Blvd., St. Louis, Mo. Being motor driven and entirely self-contained, no feed connection to the milling machine is required.

The 42-inch table is equipped for infinitely variable feed. With the use of sub-plates, the table diameter can be increased to 60 inches. Tables are furnished with standard equipment for conventional work. Index-plates and special electric equipment are available for special applications. The T-slots are optional.

Also displayed will be an "Electromill" boring, drilling, and milling machine (MACHINERY, page 219, September, 1954); a No. 50 vertical milling and precision boring machine; a No. 25 "Jig-master" medium-capacity jig boring machine; and a hole-grinding



Power-feed rotary table to be shown by W. B. Knight Machinery Co.

attachment that can be mounted on the vertical spindle of any jig boring or milling machine.

Indicate item 107 on postcard, page 325

surface finish obtainable with surface grinding. A new feature of this machine is the power table traverse that is used to speed up table movement from the loading to the grinding position.

By means of automatic cycle control, most of the phases ordinarily performed by the operator, including the important item of size control, are accomplished by the No. 18C grinding machine (left). On suitable work, a toler-

(Continued on page 192)

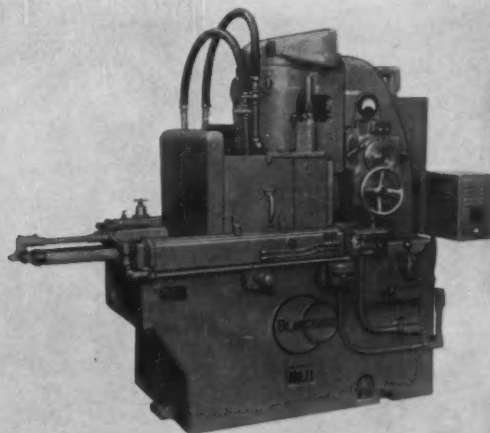
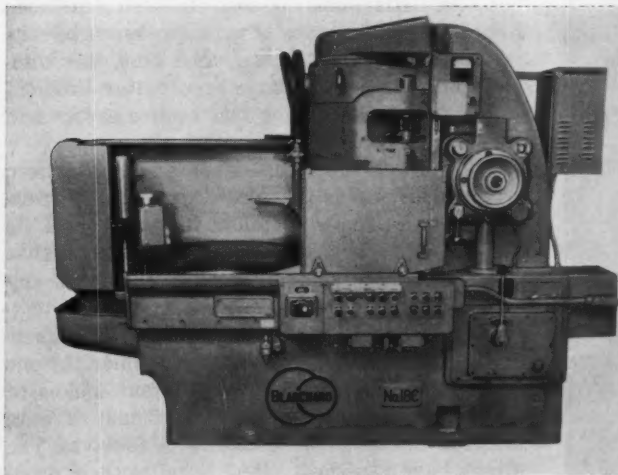
Blanchard Vertical-Spindle Surface Grinding Machines

Machine Tool Show, Booth 406

Two vertical-spindle rotary-table surface grinding machines will be exhibited by Blanchard Machine Co., 64 State St., Cambridge, Mass., along with a display

of various grinding wheels and accessories.

The No. 11 grinding machine (right) will be used to demonstrate the accuracy, flatness, and



Small Blanchard surface grinding machine (right) is designed for precision applications. Larger model (left) features an automatic cycle control for lightening the duties of the operator

More and Better Tools for a Bigger Job

NOVEMBER 23, 1954 was a significant date for America. On that day the fifty-millionth automobile produced in this country by General Motors rolled off the assembly line. No company before this had even come close to building that number of cars. No production feat of comparable dimensions had ever been accomplished.

The building of 50,000,000 cars was far more than a benchmark of production. Above all, the achievement signalized what can be done by the free exercise of individual initiative, the free pooling of resources, and free collaboration of many hands and minds in a common task.

Needless to say, those 50,000,000 cars were not built by General Motors alone. Thousands of firms all over America participated. Conspicuous among them, certainly, have been the machine tool builders. Their ingenuity, imagination, and versatility have provided constantly better tools to help do the job.

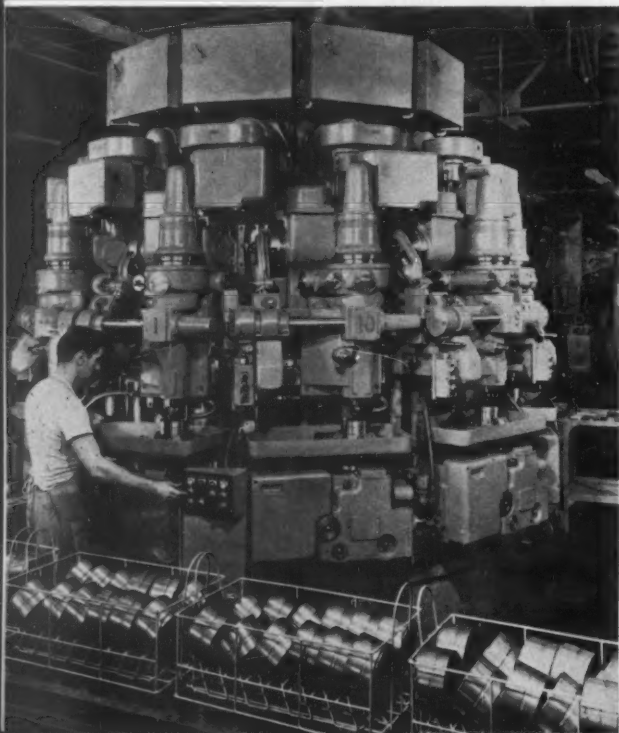
In 1908, the year that General Motors was organized, neither the machine tool industry nor the automobile industry loomed significantly on the nation's industrial horizon. Today the country's machine tool builders comprise a billion dollar industry. The automobile industry, directly and indirectly, accounts for one job out of every seven in America, or a total of 9,000,000. It may validly be said that over the past half century the automobile and the machine tool industries have shared in, and supported, each other's progress.

When General Motors first began producing cars nearly forty-seven years ago, a typical "quality" car was the Cadillac Model G "limousine," which sold for just under \$3000, "including three oil lamps and horn." The fifty-millionth General Motors car happened to be a Chevrolet. Yet this low-priced car of 1955 is so far advanced over the most expensive automobile available in 1908 as to defy comparison. In fact, it is an infinitely finer piece of transportation machinery than the industry knew how to build—at any price—as recently as 1929.

The machine tool industry has played an outstanding role in helping to make this progress possible. Better tools and manufacturing methods have brought the price of automobiles within the reach of the many. At the same time, this combination has produced an ever better product. Value for the customer has been steadily and substantially improved.

This process of value improvement has been accelerating under the forced draft of vigorous competition. The automobile industry from its inception has been most intensely competitive. It is even more competitive today than at any time in its 50-year history.

In this industry, competition means aggressively seeking the favor of the customer. At one time or another some 2700 different makes of cars have been on the market. Today a bare handful of those original 2700 survive. The others have vanished. Why? Because their products did not have sufficient appeal to one person—the customer.



By HARLOW H. CURTICE, President
General Motors Corporation

This fact has significance for all concerned in the job of supplying America's requirements for automobiles, including the machine tool industry. We in the automobile industry are the customers of the machine tool industry in only a limited sense. The customer of the machine tool industry, in the final analysis, is the man who buys our product. The capabilities of the tools of production furnished us help determine the kind of job we can do for our customers. That in turn has an important bearing on our volume of business—hence on that of the equipment suppliers.

Progress achieved just since the last war in offering automobile customers better values has far outstripped anything that went before. Consider, for example, the many new developments—higher compression engines; automatic transmissions; power steering; power brakes; and air-conditioning. Hand-in-hand with these engineering improvements have gone outstanding advancements in body design, such as the two-door and the four-door "hard tops," and the panoramic windshield. These improvements have had an industry-wide impact.

What of the opportunities ahead? Just as our research laboratories, engineers, and stylists work years ahead, so we make it a practice to appraise and anticipate the markets for our products in the future. Our studies indicate that sometime in the early nineteen sixties our country should achieve a gross national output of \$500,000,000,000. We find that by 1962 the population may total 184,000,000, almost 20,000,000 more than today. The number of households should increase from 48,000,000 to about 54,000,000 and create a tremendous new demand for homes, and motor vehicles.

Assuming maximum utilization of the country's economic resources—in other words, full employment—it is estimated that the disposable personal income might well be about 40 per cent higher than it is today. Motor vehicle registrations now total about 58,000,000—by 1962 there may well be over 75,000,000 vehicles registered.



The challenge and the opportunities held out for the machine-building industry and ours, are unprecedented. In an expanding economy, and with the accelerating trend to suburban living, we can expect to see an increasing number of people rely more and more heavily upon the automobile as a means of individualized transportation. The number of two-car families is growing substantially every year.

We intend year by year to design and build better values into our products, thus strengthening the incentive to buy. This objective presents a challenge not only to automotive stylists, engineers, and production men, but to the designers and builders of machine tools as well. Better product values for customers must flow from still further improvement in our technology, and technological advance is basically a matter of better tools and better ways of using them.

The American machine tool industry has produced the world's finest tools. We count on the industry's ingenuity and creativeness for continued advances in tool design.

Some people are now referring to technological improvement as "automation." Many are confused by this new word. It is just another term for a process that has been largely responsible for the rising standards of living to which the automobile industry and mass production have contributed so much. The machine tool industry has of course been a prime mover in that process.

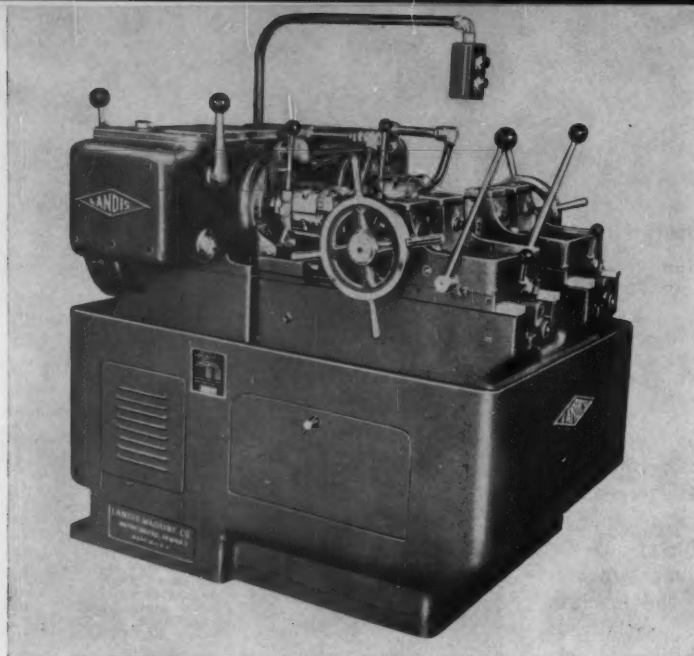


Fig. 1. Double-spindle Model 6C "Landmaco" 3/16- to 7/8-inch thread-cutting machine

ance of plus or minus 0.0005 inch can be held in regular production. After initial set-up, the operator loads the work on a magnetic chuck, closes the chuck circuit, and presses the "cycle start" button. The machine automatically completes the grinding cycle and returns the work to the loading

position without any attention from the operator.

Another development not previously exhibited is a cylinder wheel holder that eliminates sulphuring cylinder wheels into rings and reduces the time required to change wheels.

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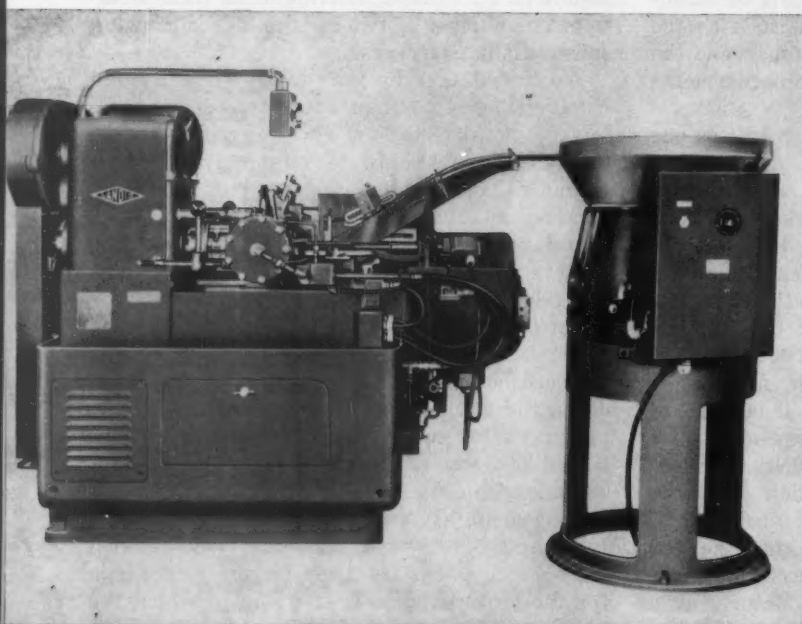


Fig. 2. Landis No. 1 automatic machine for threading, reaming, and chamfering nipples

Landis Thread-Cutting and Thread-Rolling Machines

Machine Tool Show, Booth 1406

Production thread-rolling on the "Lanhyrol" thread-rolling machine will be the feature exhibit of the Landis Machine Co., Waynesboro, Pa. This machine has been described in detail on page 202 in the May 1955 issue of MACHINERY.

A new line of "Landmaco" thread-cutting machines, Fig. 1, will be introduced. Both single- and double-spindle models will be available in five sizes, with or without lead-screw feed provisions. Model 5C, the smallest unit, has a capacity for work-pieces ranging in diameter from No. 4 to 5/8 inch. Model 20C, the largest unit, has a work-piece diameter range of 3/16 inch to 2 1/2 inches.

Also to be displayed is the newly developed No. 1 automatic nipple-threading machine, Fig. 2, designed to ream and chamfer nipples in a continuous automatic operation. It features a 1/8- to 1/2-inch nipple diameter range, and a maximum nipple length of 4 1/2 inches. The illustrated vibratory hopper may be purchased as additional equipment.

In addition, a Model 32C heavy-duty precision threading machine and a No. 1 centerless thread-grinding machine will be shown with a complete line of threading tools.

Indicate Item 109 on postcard, page 325

Firth Sterling Features Tool-Holder

Navy Pier, Booth 837

Firth Sterling, Inc., Pittsburgh, Pa., will have on exhibit its line of high-speed steels, tool and die steels, stainless specialties, and high-temperature alloys, as well as Firthite (sintered tungsten carbide) tips, blanks, tools, dies, and wear parts.

On prominent display will be the new Firthite Thrifttool, an inexpensive mechanical tool-holder. It consists of a shank and simplified clamp, and accommodates throwaway carbide inserts. The Thrifttool is available in five styles and a wide range of sizes. Regrinds are possible on six edges of the insert before it must be discarded, reducing costs considerably.

Indicate Item 110 on postcard, page 325

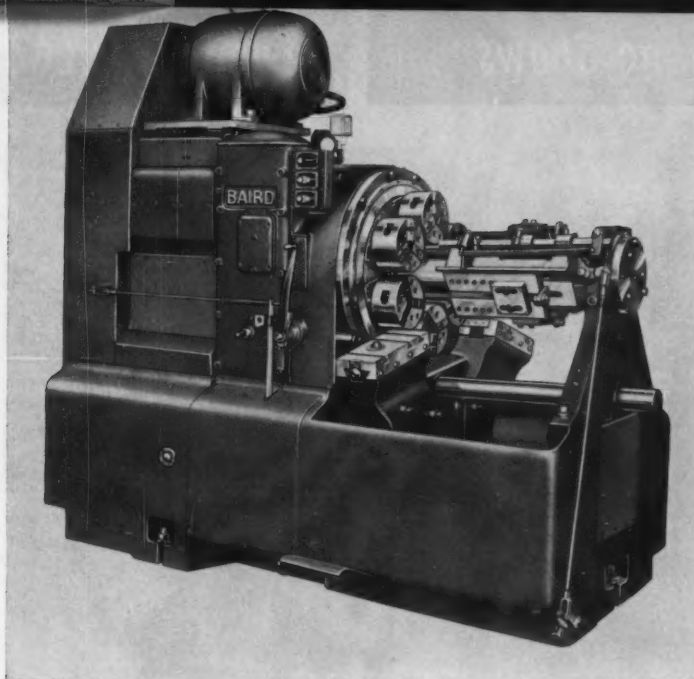


Fig. 1. A Baird six-spindle chucking machine for piston production lines

Baird Chucking Machine, Transfer Press, and Vertical Lathe

Coliseum, Booth 619

The Baird Machine Co., Stratford, Conn., will exhibit five basic high-production types of equipment, with a comprehensive range of tools and accessories. A No. 76-

H six-spindle chucking machine, Fig. 1, will be seen performing a complete series of operations on automobile pistons. Another interesting demonstration will be con-

cerned with a No. 3-25 multiple-transfer press, Fig. 2. This machine can perform as many as fifteen operations while the work advances from station to station. The product turned out by this machine consists of trademark medallions which will be a part of a key-ring memento of the show to be given to visitors.

A No. 2 four-slide automatic wire-forming machine will illustrate how simple tooling can be used to produce complex wire parts. The company's No. 00 four-slide machine—only 2 feet square and 10 inches high—will be turning out tiny wire parts. An important feature of the exhibit will be a No. 54-VC vertical continuous lathe.

Indicate Item 111 on postcard, page 325

Red Ring Gear Production Equipment and Broaching Machine

Machine Tool Show, Booth 1215

A complete gear shaving and inspection department will be in full operation at the booth of the National Broach & Machine Co., Detroit, Mich. Newly developed or improved equipment to be dis-

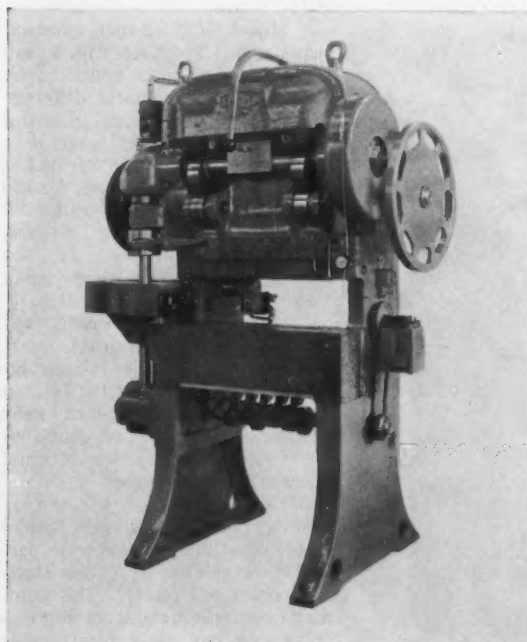


Fig. 2. Automatic multiple-transfer press which has been brought out by the Baird Machine Co.

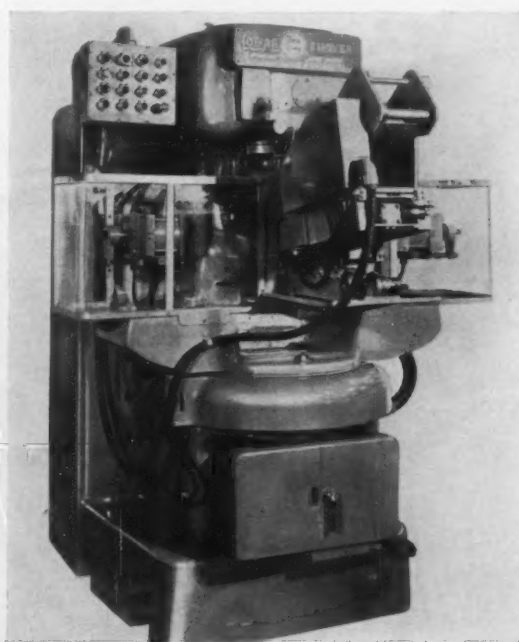


Fig. 1. External 12-inch capacity gear-shaving machine to be shown by National Broach & Machine Co.

Preview of the Chicago Shows

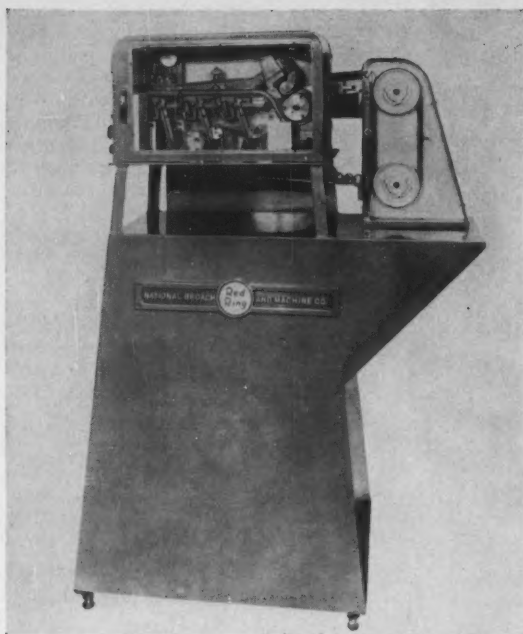


Fig. 2. Red Ring gear gaging and sorting machine to be demonstrated with small automotive helical pinions

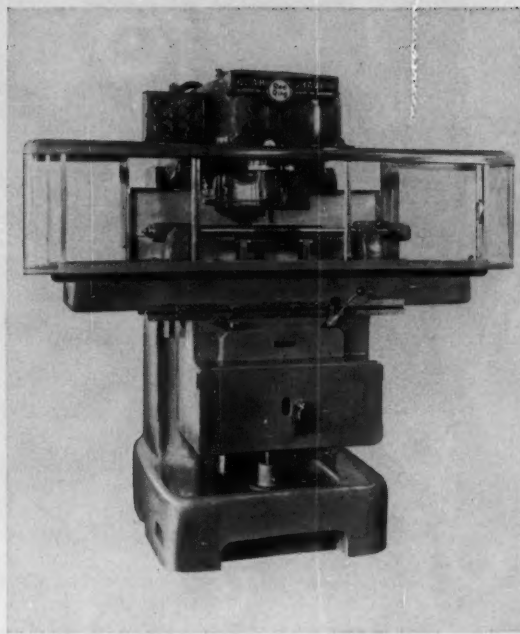


Fig. 3. External gear-shaving machine with special long table brought out by National Broach & Machine Co.

played includes a Red Ring Model GCU 12-inch external gear-shaving machine, Fig. 1, having an automatic loading device and an automatic differential up-feed

mechanism. This machine will be shaving helical cluster gears for automotive transmissions.

An automatic gear gaging and sorting machine, Fig. 2, will be

among the exhibited gear production equipment. This machine will be in operation checking and sorting small helical pinions, intended for use in automotive automatic transmissions, for accuracy of tooth size.

A Model GCU 12-inch external gear-shaving machine, Fig. 3, will be equipped with a special long table and an automatic differential up-feed mechanism. Shaving of a 7-inch wide helical gear, having an integral shaft 24 inches long, will be demonstrated. Also to be displayed is a self-contained air-powered broaching fixture, Fig. 4. It is designed for the economical broaching of small parts at high-production rates.

In addition, the recently announced 12-inch internal gear-shaving machine, the 14-inch internal gear speeder, the 10-inch gear speeder, the 12-inch gear checker, and a standard gear-rolling fixture adapted for internal gears will be exhibited.

All shaving machines in the exhibit will be equipped with special transparent plastic guards to permit Show visitors to see the shaving operations clearly. The automatic gear gaging and sorting machine has one clear plastic side panel enabling visitors to see the action of this device.

Indicate Item 112 on postcard, page 325

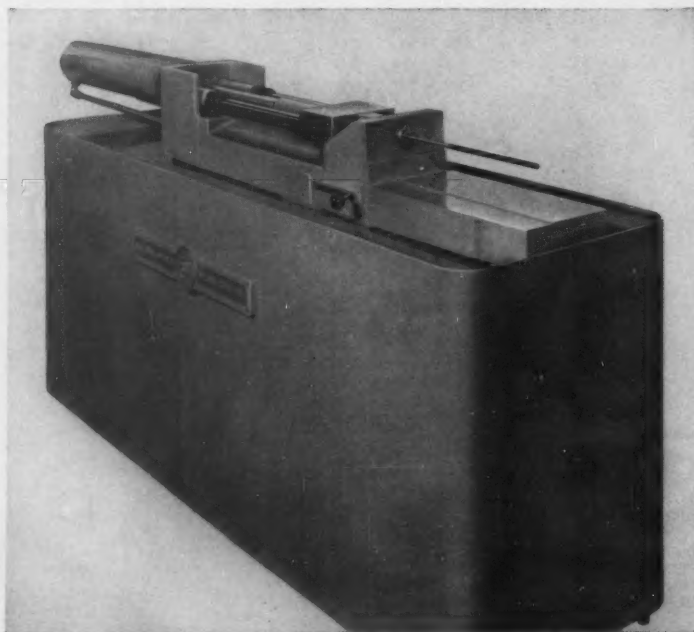


Fig. 4. Self-contained Red Ring pneumatically operated broaching fixture for economical production of small parts

Show Previews

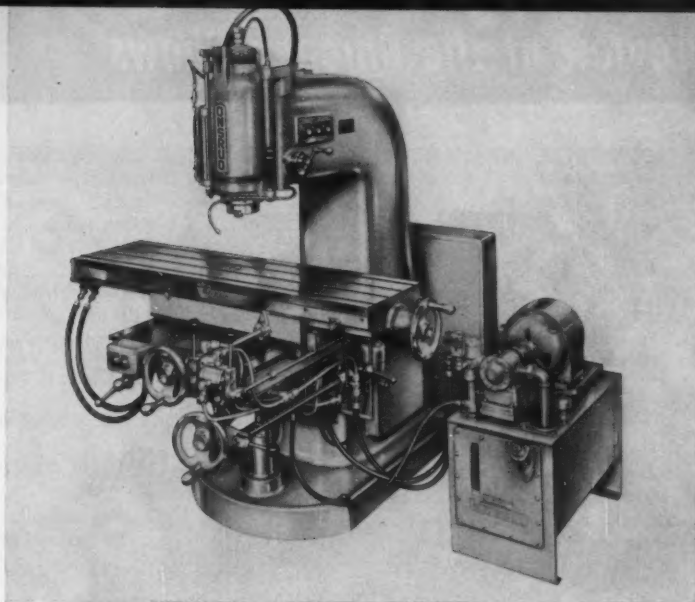
Onsrud Milling Machine

Machine Tool Show, Booth 812

To be shown to the public for the first time will be the Model A245 fluid-feed milling machine. This medium-size vertical milling machine, built by Onsrud Machine Works, Inc., Niles, Ill., features power table feed in all directions, instant manual control without stopping the hydraulic system, and a two-speed, 7.5/15-H.P. liquid-cooled induction cutting head.

Other equipment to be demonstrated will include high-speed milling machines for non-ferrous metals, portable grinders, portable routers, and cutters.

Indicate Item 113 on postcard, page 325



Fluid-feed milling machine to be demonstrated by Onsrud Machine Works, Inc.

New Series of Ferracut Sheet-Metal Presses

Machine Tool Show, Booth 1311

A new 200-ton open-back inclinable press, having a counterbalanced box type ram, will be displayed by Ferracut Machine Co., Bridgeton, N. J.

Standard equipment on this press includes a new air-powered, electrically controlled friction

clutch with interconnected brake and single-point adjustment. Accurate control is thus provided for start-stop type operations.

Other presses of this type are available in 110- and 150-ton capacities. These presses will accommodate any type automatic or semi-automatic feed attachments. A bed-mounted die cushion can be installed for drawing medium-gage metal. All three machines

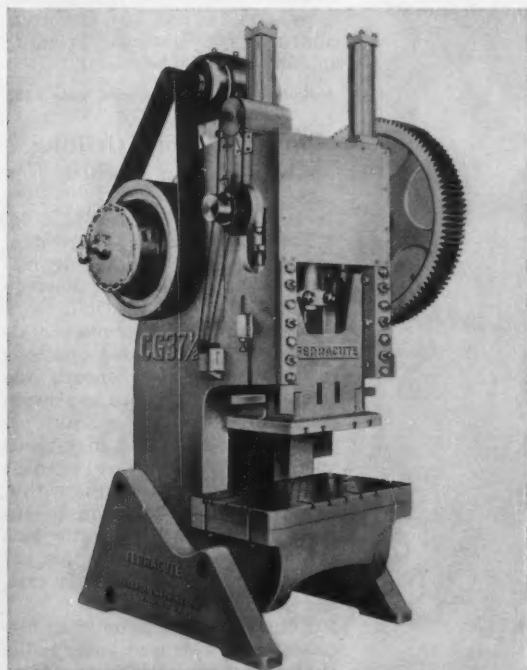
in this series are provided with automatic lubrication.

Indicate Item 114 on postcard, page 325

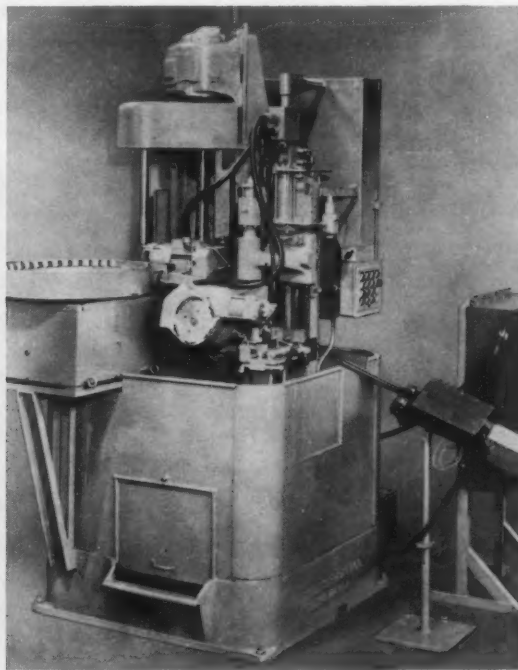
Lees-Bradner Automatic Gear-Hobbing Machine

Machine Tool Show, Booth 1212

The Lees-Bradner Co., Cleveland, Ohio, will present a gear-hobbing machine equipped with

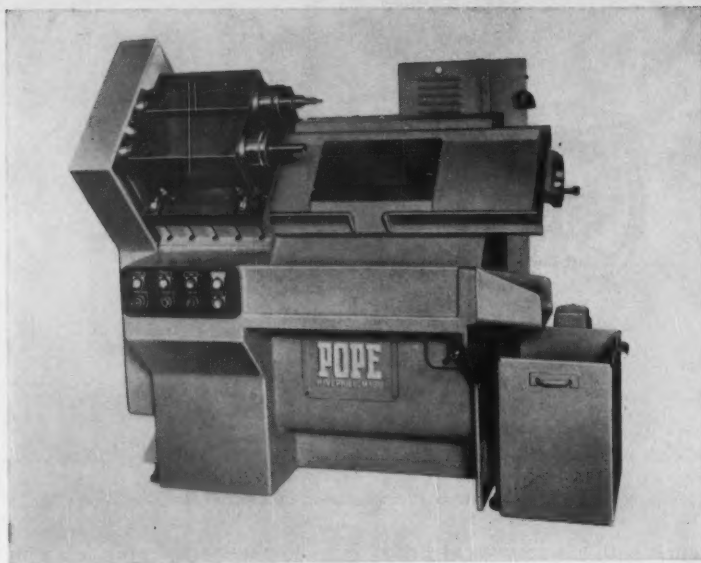


Ferracut 200-ton open-back inclinable press which incorporates many new features



Heavy-duty gear-hobbing machine with Auto-Motion to be displayed by Lees-Bradner Co.

Preview of the Chicago Shows



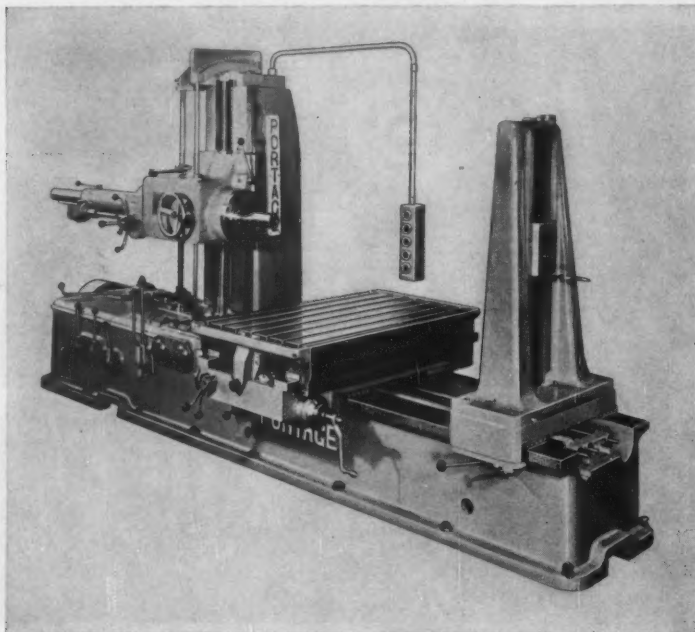
Precision boring machine to be exhibited by Pope Machinery Corporation

"Auto-Motion." This single-spindle, heavy-duty machine will not only be equipped with a means of self-loading and unloading, but also with a checker and feed-back unit that will provide pitch-diameter control and also signal the machine for shifting of the hob. Both single- and multiple-spindle machines of this style, Model 7

Type HD, have been field-tested.

Features of this machine include a welded steel base with a chip clean-out chute; a heavier headstock than the previous model; a larger and heavier column; a new hob head providing spindle speeds up to 1000 R.P.M., and a 3-inch hob shift.

Indicate Item 115 on postcard, page 325



Horizontal boring, drilling, and milling machine shown by Portage Machine Co.

Pope Precision Boring Machine

Machine Tool Show, Booth 117

To be presented for the first time by Pope Machinery Corporation, Haverhill, Mass., will be their new Model R-2 precision boring machine. It is a multiple-spindle, single-end machine having a table stroke of 9 inches. No cams, change-gears, sprockets, or linkages are employed, electrical control and mechanical-rotating operation being combined to achieve simplicity and versatility. This design provides infinitely variable feed and traverse rates. An automatic operating cycle includes a timed loading period when desired. The table and bridge are set at an angle of 45 degrees to permit rapid loading, unloading, and the free flow of coolant and chips.

Another display will include a cross-section of the company's motorized grinding spindles. Included in this exhibit will be a motorized cartridge type grinding spindle with a section of the cartridge cut away to reveal the bearing arrangement, and several similar spindles equipped with a high-speed vertical grinding attachment and a high-speed horizontal grinding attachment. A foot-mounted, belt-driven milling spindle, and a line of belt-driven, cartridge type internal grinding spindles will also be shown.

Indicate Item 116 on postcard, page 325

Portage Boring, Drilling, and Milling Machine

Coliseum, Booth 521

The bed of the No. 4 horizontal boring, drilling, and milling machine to be exhibited by Portage Machine Co., Akron, Ohio, is a heavy, reinforced, one-piece casting without large cored openings in the base walls beneath the column. This is claimed to provide the rigidity required for heavy, accurate work as well as high-speed operations. A swinging pendant type push-button station is within easy reach of the operator. It contains five operational selector buttons: forward spindle rotation, reverse, jog forward, jog reverse, and stop.

Filtered oil is automatically circulated by a gear type pump to the shaft bearings and to the feed-change, speed-change, and feed-distribution gears. A piston type

Preview of the Chicago Shows

pump, operated by a cam on the spindle sleeve, supplies filtered lubrication for the various spindle drive- and feed-shaft bearings in the main part of the machine head.

A manually operated rotary table, designed to combine ease of rotation with rigidity and accuracy at all settings, will also be

displayed along with an angular milling attachment for use on the No. 4 horizontal boring, drilling, and milling machine. A gear ratio of 1 to 1 is provided within the angular milling attachment so that the cutter-spindle speed will be the same as that of the driving spindle.

Indicate Item 117 on postcard, page 325

4840 R.P.M. with an 1800-R.P.M. motor, or 342 to 4033 R.P.M. with a 1500-R.P.M. motor.

The same type bearings as used on the 16-inch machine spindle are used on the full-floating spindle of the 18-inch Royal, Fig. 2. Six spindle speeds are provided, ranging from 390 to 3100 R.P.M. using an 1800-R.P.M. motor; from 324 to 2580 R.P.M. with a 1500-R.P.M. motor; from 259 to 2060 R.P.M. employing a 1200-R.P.M. motor; and from 216 to 1715 R.P.M. with a 1000-R.P.M. motor.

In addition to these machines, the company's 16-inch sliding-head bench, floor, and multiple-spindle drilling machines will be shown. Also displayed will be the "Hardclad" radial drilling machine claimed to be the first such machine with a flame-hardened column, and the all-g geared, Model LE "Tray-Top" engine and tool-room lathe.

Indicate Item 118 on postcard, page 325

Cincinnati Drilling Machines and Lathe

Machine Tool Show, Booth 309

Two new series of Model LE drilling machines, the 16-inch Royal and the 18-inch Royal, will be exhibited by Cincinnati Lathe & Tool Co., Cincinnati, Ohio. Both series are suitable for production, tool-room, maintenance, school, and general-purpose duty. Single-spindle bench and floor models, and single- and multiple-spindle bench models are available.

Using an 1800-R.P.M. motor, the 16-inch Royal, Fig. 1, is rated at 1/2-inch capacity. The 1/2-inch capacity chuck is mounted on a taper plug spindle, a No. 2 Morse taper spindle without a chuck being optional. Four precision, sealed, lifetime-lubricated bearings support the full-floating spindle. Five spindle speeds are provided, ranging from 410 to



Fig. 1. Royal 16-inch drilling machine

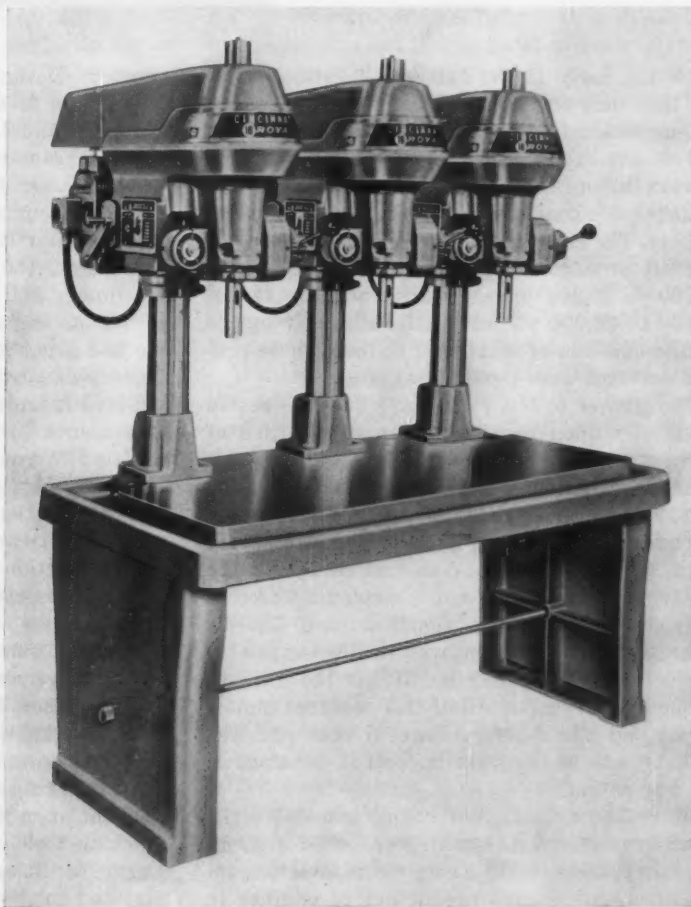


Fig. 2. Royal 18-inch drilling machine to be shown by Cincinnati Lathe & Tool Co.

By **FREDERICK B. RENTSCHLER**, Chairman
United Aircraft Corporation



IN the early 1940s, James Forrestal who at that time was Secretary of the Navy, asked my evaluation of some top-secret reports he had received regarding the rate of aircraft production in both Germany and Japan. He was obviously quite concerned over the contents of the reports. The stated estimate for German combat aircraft production, he said, was at the rate of 30,000 to 40,000 planes yearly, and for Japan, 20,000 to 25,000 planes yearly. He flatly put to me the question of whether I believed these production rates were possible.

The answer to Mr. Forrestal's question rested essentially upon the production capabilities of Germany and Japan. Nevertheless, our own national experience in putting our aviation industry into World War II production had a bearing on the question. In mid-1940, President Roosevelt, in an address to the nation, had called for the construction of 50,000 combat airplanes which he deemed necessary for national defense. Shortly thereafter, this statement was modified to call for production of combat aircraft at the rate of 50,000 planes yearly. All of this occurred almost a year and a half before Pearl Harbor and was probably one of the most important decisions of the war period.

Overnight a small but competent and virile aviation industry was confronted with a seemingly impossible task. Everyone in aviation instinctively knew that production of engines in these tremendous quantities was the critical

problem. Designs of good engines were on hand. Production facilities for engines, however, were keyed to annual rates of several thousand and the new program required hundreds of thousands.

The pattern for this greatly expanded production requirement was set up within a matter of months after the President's announcement. At this point, the all-important requirement was machinery and machine tools to equip the tremendously expanded production facilities. While we had great respect for the excellence and efficiency of our machine tool industry, few of us believed it could measure up to these unusual requirements. In the case of Pratt & Whitney Aircraft's own program, it is a fact that we required but three months for the completion of buildings, and six months for the delivery and installation of machinery and machine tools which permitted first production to commence within nine months.

Our American machine tool industry measured up fully to a seemingly impossible delivery requirement, a mute testimonial to generally excellent management and great flexibility of that industry. When Mr. Forrestal posed his question to me, we knew that here, or in any other country, the engine was the most critical requirement. Increased rate of production was completely dependent upon the availability of machinery and machine tools. We were familiar with aviation engine facilities in both Germany and Japan. We also had good knowledge of their respective machine tool industries as to both quality and ex-

MACHINE TOOLS— An Important Factor in Air Supremacy

tent. I immediately rejected any thought that either Germany or Japan could possibly match our own machine tool industry.

Accordingly, I indicated to Mr. Forrestal that in my judgment Germany could not exceed an annual production rate of 15,000 combat aircraft, and that Japan could not possibly reach 10,000 planes. Shortly after the war, when Mr. Forrestal was the Secretary of Defense, he told me that according to the government's best knowledge the German rate of production was somewhere between 12,000 and 15,000 combat airplanes yearly and the Japanese rate somewhere between 7500 and 10,000 planes. On the other hand, the United States came out of World War II with the No. 1 airforce both as to quality and quantity. Among other things, we had attained a production rate of about 100,000 aircraft yearly—substantially more than the combined output of both our enemies and allies.

Russia set out after the end of the war to challenge our supremacy in the air. The climate was ripe for this beginning because of the new gas turbine development which temporarily placed all nations on something of a parity with respect to combat types. No one questions the Russians' engineering and mechanical ability. In addition, they were favored by two unusual events. In 1947, the British government sold Russia a quantity of Rolls-Royce turbine power plants. At that time, the Nene was probably the most efficient as well as the most powerful turbine engine developed and in production. This immediately brought Russian know-how on a parity with other nations. In addition, the Russians at the end of the war carried back behind the Iron Curtain not only all German facilities and designs of turbines but also a number of German scientists and engineers.

The development of the gas turbine engine has moved very fast since World War II. There are entirely new combat types on hand in Russia and in America. The relative characteristics of

the Russian and American combat fighters and bombers is a highly controversial question. We have comparatively little first-hand exact knowledge of the Russian types. The conservative estimate would be to assume that the Russians have progressed as rapidly as we have in America. This is theoretically possible. The same conservative approach would be to believe that Russia can at least match our production potential. In my own personal judgment, both of these assumptions seem illogical and unfounded.

Military restrictions preclude all but general statements regarding the status of American combat types, but I am willing to go on record that no other nation at this time is in a similar state of development of production types which will match our current vintage of fighters and medium and heavy bombers. Specifically, these might be designated as the North American F-100 Super Sabre, which shortly will be joined by other supersonic fighters, and our Boeing B-52 heavy or intercontinental bomber types.

What is equally important is the fact that I am not willing to concede that the Russian industry can match our production potential of combat aircraft. One of the reasons for this is that, in my opinion, the Russians cannot compete with our machine tool industry.

There are other factors which I think are in favor of the belief that we have not by any means surrendered leadership in the air to Russia. We have a well-developed pattern of strategically located air bases which would be invaluable in an intercontinental war. Our long leadership in military and commercial air transport has provided us with a backlog of unmatched facilities for the specialized training of pilots, and, what is perhaps most important is the fact that to date, whenever they were called upon, American pilots have proved to be the best in the world. It is my well-considered opinion that we are not being outstripped in the air by any other country.

Preview of the Chicago Shows

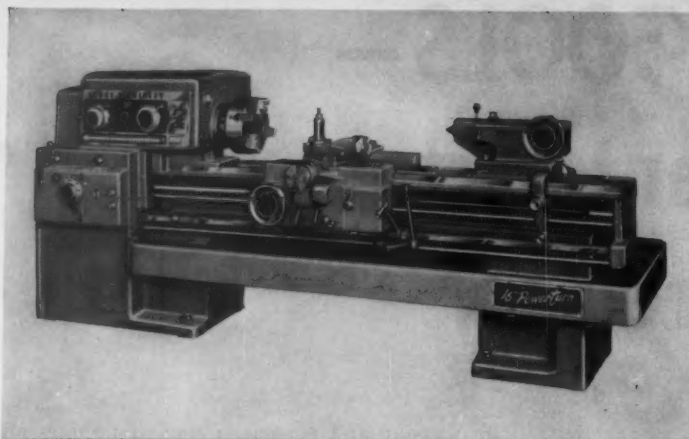


Fig. 1. "Powerturn" toolmaker's lathe to be exhibited by the Lodge & Shipley Co.

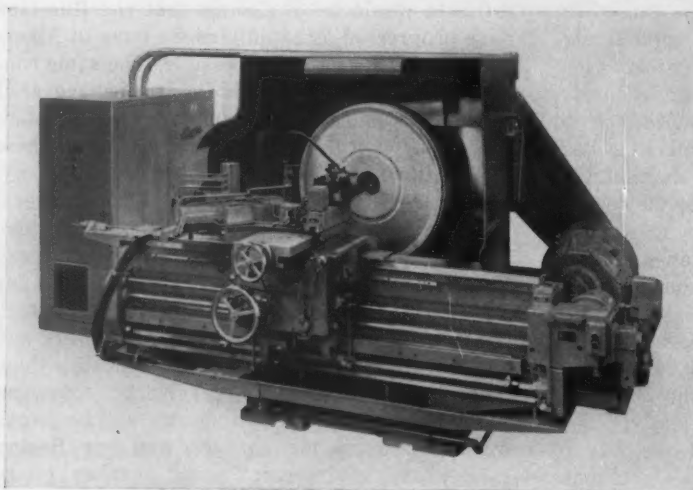


Fig. 2. Lodge & Shipley T-lathe is equipped for contour facing, turning, and boring

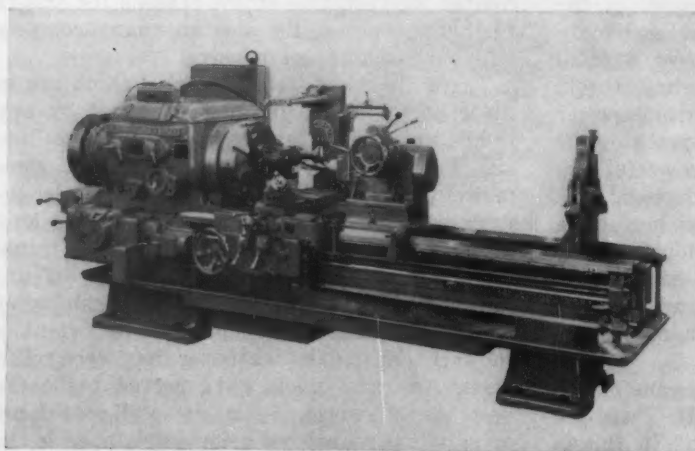


Fig. 3. Hollow-spindle "Copymatic" lathe to be demonstrated

Lodge & Shipley Lathes and Sheet-Metal Equipment

Machine Tool Show, Booth 502

Representing a complete new line of lathes by Lodge & Shipley Co., Cincinnati, Ohio, will be the 16-inch "Powerturn" toolmaker's lathe. This lathe, Fig. 1, has a computing head which merely requires the setting of two dials to obtain the correct indicated positions for three speed-shifting levers. All controls have been conveniently grouped and distinctively shaped for fumble-free operation. Among other new features are a positive brake that may be quickly released for shifting, a built-in horsepower ammeter that continually indicates the amount of lathe capacity being utilized, and a micrometer carriage dial that indicates movement of the carriage directly in increments of 0.005 inch.

One of the most versatile models of the company's T-lathes, Fig. 2, will be demonstrated. It can be used for contour facing as well as contour boring or turning. All this is accomplished on a single carriage that is "Copymatic" equipped, having both a 45-degree tracing slide and a 90-degree standard cross-slide. Universal functioning is obtained through the ability of the machine to follow either a facing template or a turning and boring template with individual tracing heads.

Also to be demonstrated will be the 25-inch hollow-spindle "Copymatic" lathe, Fig. 3. An 8 7/8-inch diameter hole through the spindle allows the lathe to accommodate longer work-pieces than would normally be possible. The lathe to be displayed will be performing such operations as contour turning and facing, and taper threading by automatic duplication.

Included in the exhibit will be a "Floturn" lathe which will be tooled up for, and working on, a complex jet-engine part. The demonstration will accent the speed and versatility of this process of axially rolling simple sheet-metal blanks into more complicated forms. Two 10-inch "Hi-Turn" lathes, offering speeds up to 3000 R.P.M. and having a 5-H.P. drive motor, will be part of the display. One of the lathes will be set up for a conventional operation, while the other lathe will be operating with a more complicated tooling set-up.

The Hamilton Division of the company will display their Model 180-10 power press brake, Fig. 4,

Preview of the Chicago Shows

which will be in operation on multiple-die work. Among the features of this brake are an exclusive wedge type ram-pressure release that can be operated in the event of stalling; a motor-operated micrometer ram adjustment with direct-reading indicators showing vertical adjustment in 0.001 inch; and a specially designed air clutch and brake. Capacity of the machine is 10 feet by 5/16 inch.

Along with the press brake will be demonstrated the Model 0610 power squaring shear. This shear, Fig. 5, will be equipped with the "Hydro-Hold" hold-down system. Another clamping system, in which hold-down impact damage and noise are virtually eliminated, will be introduced. Using an air-oil-electric system, the hold-down fingers are brought into gentle contact with the work surface, the holding power being developed before the blade cuts. Among the other features of the shear are inclined-blade cutting, and air counter-balancing.

Indicate Item 119 on postcard, page 325

Cushman to Exhibit Four New Chucks

Navy Pier, Booth 419

One of four new products to be introduced by Cushman Chuck Co., Hartford, Conn., is the "Accra-Set" chuck which is designed for work that must be machined within close limits of accuracy. Adjustment is simple, and the chuck will maintain an accuracy of 0.0005-inch total indicator reading, or better. These units are available with three or six jaws, and 6, 7 1/2, or 9-inch capacities.

An improved jaw adjustment has been developed for air-operated screw type adjustable-jaw chucks. This new design permits rapid adjustment with complete elimination of backlash, and provides a positive lock in either holding direction. With this arrangement it is possible to lock the jaw assembly without a tendency for top-jaw creep.

A three-jaw, scroll-operated compensating chuck has been added to the company's line of manually operated chucks. Design of this unit provides an appreciable amount of compensation and permits gripping of irregularly shaped work-pieces that have been previously centered by some other method. Jaw compensation is achieved by means of a two-piece

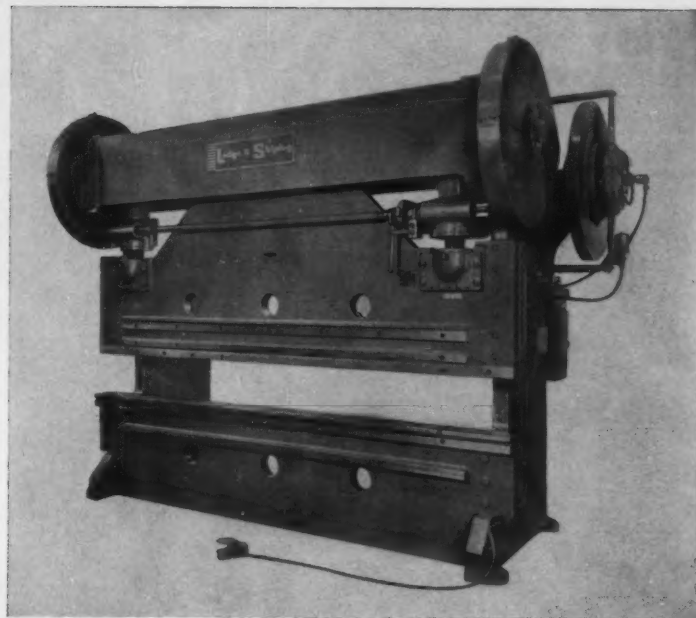


Fig. 4. Power press brake will be shown by Hamilton Division of Lodge & Shipley Co.

scroll. The lower half of the scroll is concentrically located at all times while the upper half floats due to clearance in the chuck body.

Two distinct advantages are offered by a new air-operated compensating chuck. Not only does this unit function as a compensating chuck, but also, by locking out

the compensating action after being trued up, as a conventional self-centering air-operated chuck. Compensating action is accomplished by means of a lever cage that is free to float in any direction, and into which the jaw-operating levers are pinned.

Indicate Item 120 on postcard, page 325

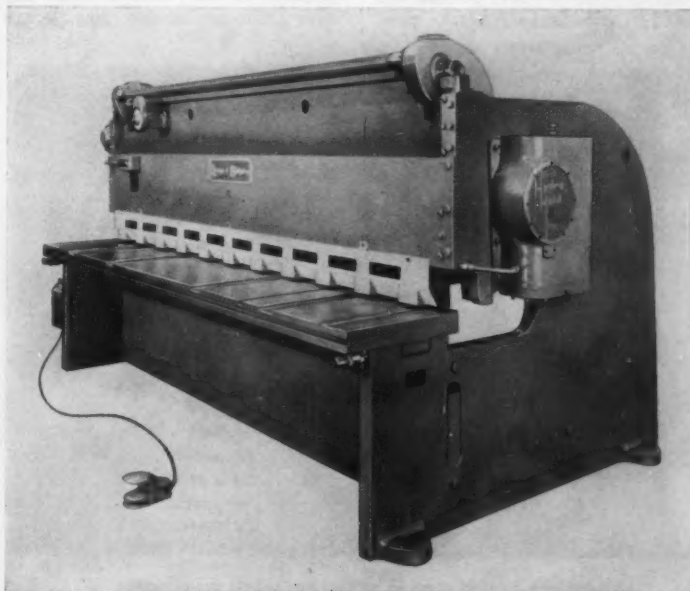
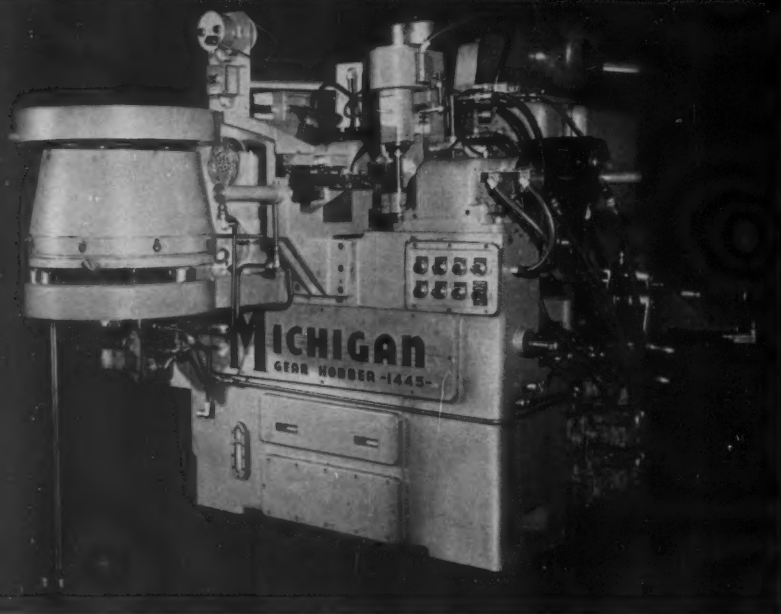


Fig. 5. Hamilton Division will also exhibit a power squaring shear

Preview of the Chicago Shows



Gear hobber featured in one of Michigan Tool Co.'s automated lines

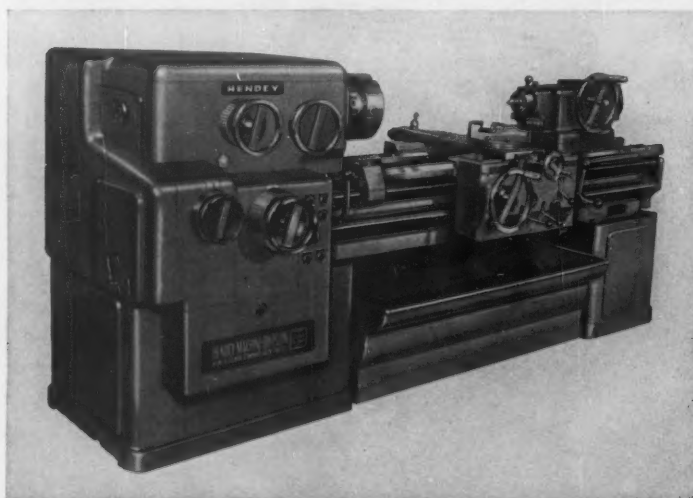
Michigan Tool to Feature "Gear-O-Mation"

Machine Tool Show, Booth 1220

"Gear-O-Mation" is the term applied by the Michigan Tool Co., Detroit, Mich., to the automated production of gears and splines. At the show, the company will exhibit for the first time a completely automated line — from blank to finished gear. Blanks will be fed to a Model 1445 Ultra-Speed

universal hobber equipped for automatic loading.

After hobbing, the work travels through a Michigan gear washer to remove any clinging chips, then through a three-way classifier. This unit accepts those gears hobbled to size, and rejects any over size or under size gears



Henley geared-head lathe features a belt drive for the top eight of thirty-two available speeds.

through separate chutes. In the event that gears check over size or under size, a feed-back system activates an automatic center-distance regulator in the hobber.

A conveyor carries accepted gears to a hopper feeding a Model 870 underpass gear finisher for shaving. Subsequently, the work passes through a second washer and a classifier that is also equipped for the size control of the shaving machine.

Other automated lines will feature a Roto-Flo spline roller and a Shear-Speed gear shaper. Use of the Roto-Flo is claimed to drastically reduce time of forming splines and similar toothed forms, and give a high degree of accuracy and finish. The Shear-Speed will be set up for automatic loading and sizing. Since all gear teeth are cut simultaneously, output of the machine is high.

Indicate Item 121 on postcard, page 325

Henley Thirty-Two-Speed Geared-Head Lathe

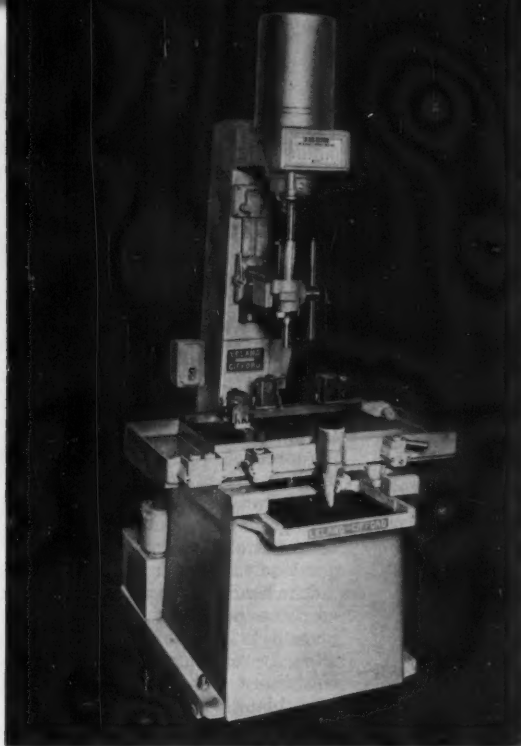
Machine Tool Show, Booth 221

A completely new thirty-two-speed geared-head lathe, designed specifically for high-speed precision production and maximum ease of operation, will be exhibited by Henley Machine Division, Barber-Colman Co., Rockford, Ill. An innovation for geared-head lathes is the use of a belt drive for the top eight speeds. The belt drive assures a smooth finish and quiet operation at high speeds where power is not a primary requirement. The twenty-four lower speeds are obtained through a geared drive.

This lathe can be furnished with maximum spindle speeds of 1000, 1500, or 2000 R.P.M., using 10-, 15-, and 20 H.P. motors, respectively. Positive braking of the spindle is provided. Two dial type handwheels, located at the front of the headstock, mechanically actuate the thirty-two speed changes.

A totally enclosed gear-box and feed-gear mechanism provide sixty-six quick-change thread and feed selections. Quick-change threads range from 2 to 120 per inch, and the feed range is from 0.0015 inch to 0.091 inch per revolution. The lathe is available in a rated size of 16 inches with an 18 1/2-inch swing over the ways.

Indicate Item 122 on postcard, page 325



Leland-Gifford "Hole-Locator" drilling machine operates without jigs or fixtures

"Hole-Locator" Drilling Machine

Machine Tool Show, Booth 321

A new line of drilling machines made by the Leland-Gifford Co., Worcester, Mass., dispenses with the use of jigs or fixtures, or the need to lay out individual workpieces. All drilling and related operations (reaming, spot-facing, counterboring, etc.) can be performed on closed or open holes. Design principle of the machine consists of a movable table which is positioned in relation to a lay-out chart by an optical viewer.

The table, with a working surface 14 by 28 inches, glides on ball bearings. Movement range is 10 inches front to rear, and 15 inches side to side. Dual locks hold the table setting, and are released by push-button operated solenoids. The optical viewer has a 20X magnification and double cross-hairs. It is mounted centrally on the front edge of the table over the lay-out chart holder, which is fixed on the base. Dowels register the holder and machine spindle.

Lay-out charts supplied with the machine are thin sheet-metal plates treated for scribing. A simplified lay-out made directly from blueprint dimensions is scribed on the chart. Where work

is dimensioned from two edges, it is banked against strips on the table and secured by quick-acting clamps. Work requiring dimensioning from a hole produced in a previous operation is positioned by using a cone center in the spindle. Holes are quickly located by moving the table to bring the scribed lines on the lay-out chart between the viewer cross-hairs.

Indicate Item 123 on postcard, page 325

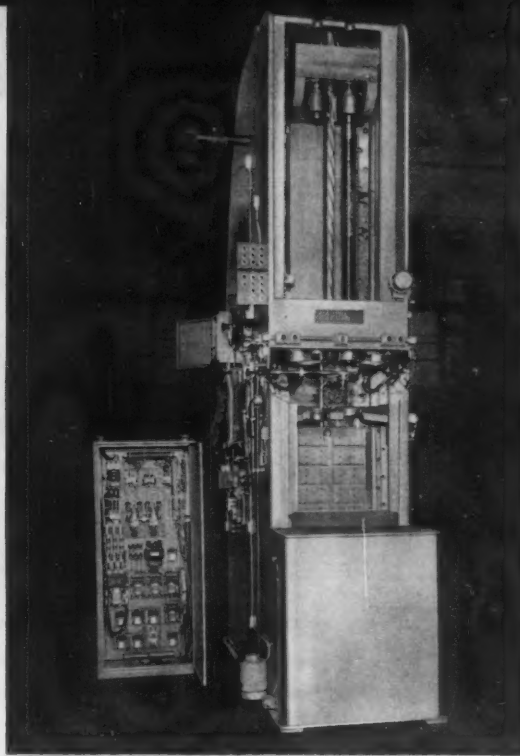


Fig. 1. Lapointe vertical pull-up machine equipped for internal spiral broaching

Lapointe Broaching Machines

Machine Tool Show, Booth 707

A highlight of the exhibit of the Lapointe Machine Tool Co., Hudson, Mass., will be a VUE-7 electric-drive, vertical pull-up broaching machine, Fig. 1. This machine will be broaching spiral gears for automobiles at the rate

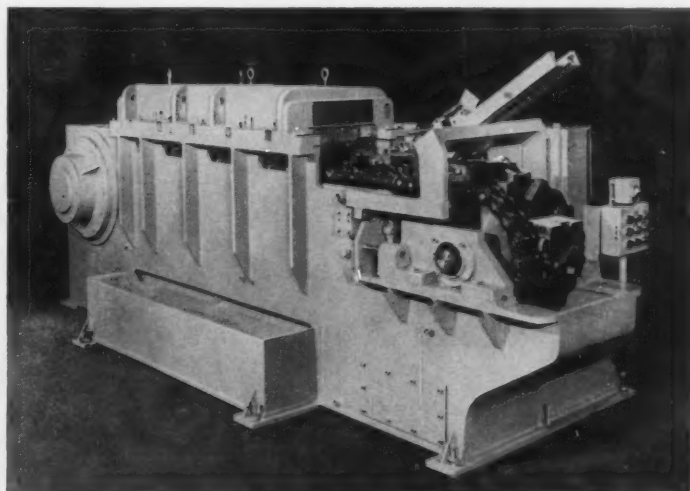


Fig. 2. Tunnel type continuous broaching machine introduced by Lapointe Machine Tool Co.

Preview of the Chicago Shows

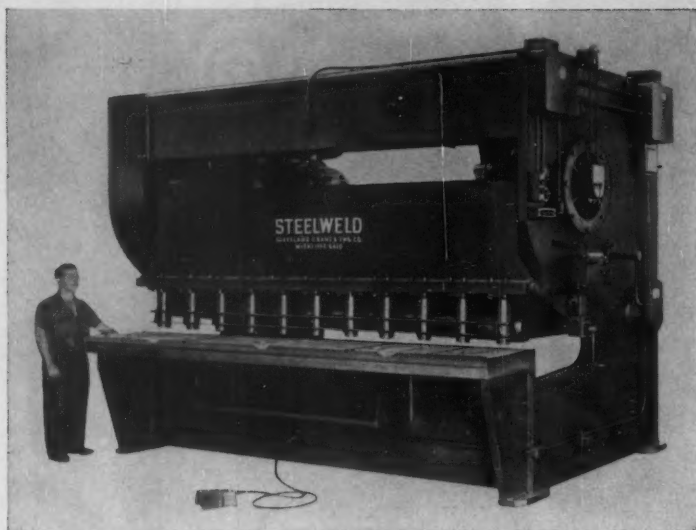


Fig. 1. Steelweld shear incorporates pivoted-blade principle to avoid wear and inaccuracy.

of 320 parts per hour. It has a 72-inch stroke and pulls two broaches at a time at a maximum speed of 40 feet per minute.

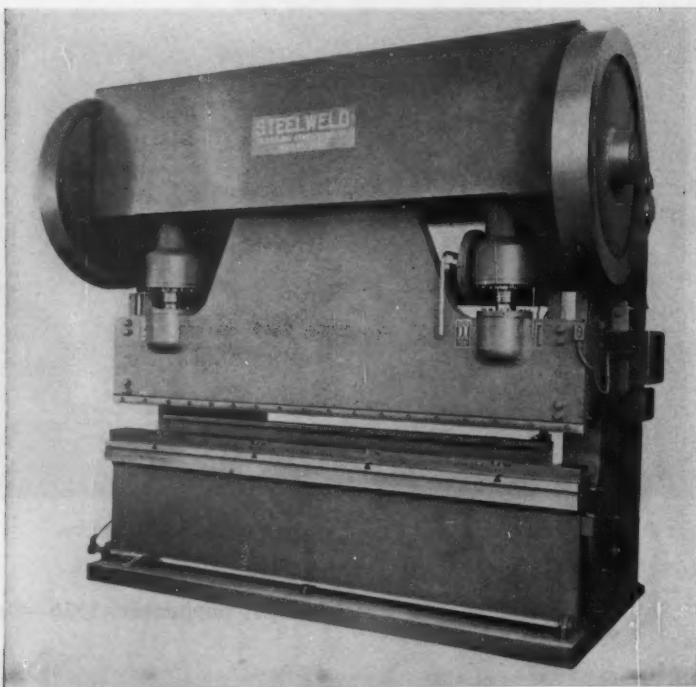
Lapointe has recently started a line of continuous broaching machines that will be demonstrated at the Show. A 60-inch capacity machine, Fig. 2, will be turning out a part for an electric typewriter. A larger continuous

broaching machine, having twenty-four work-fixtures, will be broaching connecting-rods.

Also to be seen in action is an electric-drive, 72-inch horizontal machine surface-broaching gear sprockets. The sprocket has twenty-five teeth, and broaching will be at the rate of twenty-five parts per hour.

Indicate Item 124 on postcard, page 325

Fig. 2. Bending press developed by Steelweld features both easy operation and high versatility.



Steelweld Shear and Presses

Machine Tool Show, Booth 1418

A shear, a bending press, and a drawing press will be on exhibit by the Steelweld Machinery Division of the Cleveland Crane & Engineering Co., Wickliffe, Ohio.

The shear, Fig. 1, has a capacity for a 1/2-inch thick, 12-foot wide mild steel plate, and features a blade which travels in a circular path, eliminating, it is claimed, a source of wear and inaccuracy. The machine has a foot switch which can be placed at a convenient point; a cool-running, air-operated clutch and brake; and a quick-setting knife adjustment.

The bending press to be exhibited, seen in Fig. 2, handles steel plate 1/2 inch thick and 10 feet wide. In addition to bending, the equipment can be used for forming, blanking, drawing, rubber-forming, and multiple-punching operations.

The drawing press, on view for the first time, is rated at 215 tons. A newly developed linkage provides quick approach and quick return of the ram, with a slow, constant velocity through the drawing range.

Indicate Item 125 on postcard, page 325

King Vertical Boring Machines and Elmes Hydraulic Presses

Machine Tool Show, Booth 1121

American Steel Foundries, Cincinnati, Ohio, will present two newly designed King vertical boring and turning machines and several new units in the Elmes line of hydraulic presses. Shown in Fig. 1 is a single-column 36-inch vertical boring and turning machine. A double-column, 56-inch model will also be shown under power operation.

These machines permit the maximum use of modern cutting tools through higher horsepower ratings and expanded speed and feed ranges. In the 30- to 46-inch models, ratings are 40 to 50 H.P., and in the models 56 inches and up, ratings are 75 to 100 H.P. Twenty-four feeds and twenty-four speeds are available, the latter being arranged in geometric progression in any of three standard ranges.

Controls are located both on a

Preview of the Chicago Shows

movable pendant station and on a fixed panel mounted on the side-head. The pendant has controls for pre-selective speed selection, speed change, feed and rapid traverse movements of all heads, power swiveling of rail-heads, turret index, and table stop. The fixed panel has controls for main-drive motor, rail positioning, thread cutting and taper-turning selection for all heads, and coolant pump.

Increased machining accuracy is implemented by such newly engineered construction features as improved mounting of the spindle and all heads and turrets, use of anti-backlash nuts for all cross-feed movements, unit mounting of complete transmission, and angular placement of side-head ram to reduce overhang. All machine components have been specially redesigned to reduce wear. Pressure lubrication is automatic.

Also to be shown under power operation is the 150-ton Elmes pipeless hydraulic metal-working press illustrated in Fig. 2. With this new press design, there is complete freedom from main circuit high-pressure piping trouble. All high-pressure fluid is conducted through short, direct passages drilled in the structural parts. Oil drippage is impossible with this new construction, since there is no piping and consequently no high-pressure screwed joints to loosen, or welded joints to break.

Shown in Fig. 3 is a 100-ton C-frame press representative of the complete line of Elmes C-frame presses for forcing, straightening, bending, forming, and similar operations. The basic press is designed for forcing and is provided with a U-gap in the bed. By the addition of a straightening table the unit becomes a straightening press. When a bolster plate covers the gap in the bed, the press may be used for general-purpose metal forming.

A portable self-contained hydraulic descaler will be introduced. The unit operates on the principle of automatically spraying a small quantity of water at high pressure on a hot billet covered with forging scale, then automatically ejecting the scale-free billet. Designed for universal application in all forging operations, the descaler will handle billets up to 32 inches in length and up to 6 inches in diameter.

Indicate Item 126 on postcard, page 325

September, 1955—205

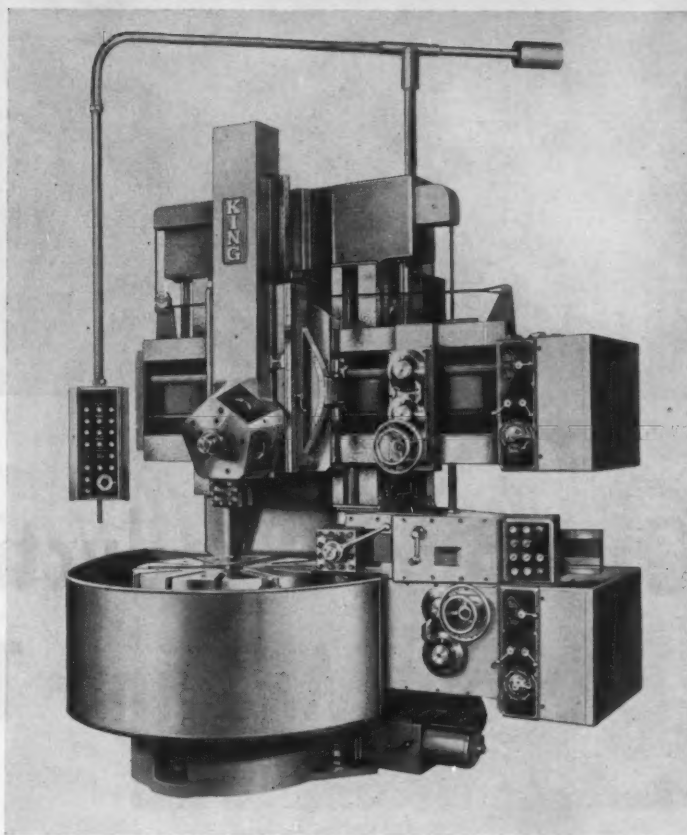


Fig. 1. Single-column 36-inch King vertical boring and turning machine.

Fig. 2. Elmes 150-ton pipeless hydraulic metal-working press.

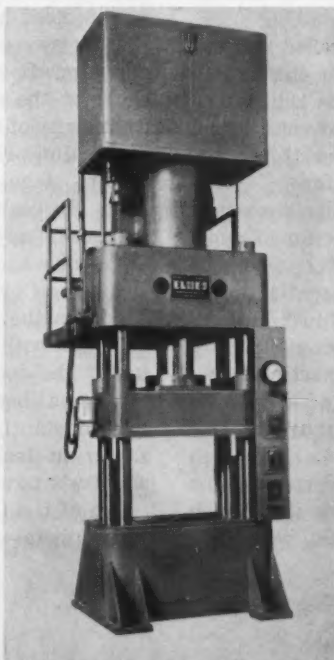
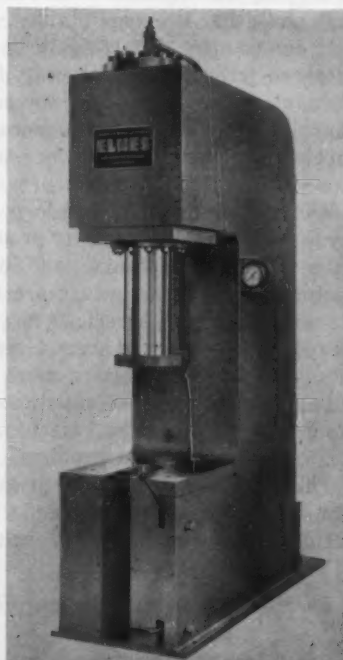


Fig. 3. Elmes 100-ton C-frame press has U-gap in bed.





Ordnance Production Relies on Machine Tools

MACHINE tools are so essential to ordnance production and our country's strength and security that they could mean the difference between existence and extinction. Their importance was clearly demonstrated in World Wars I and II, as well as in the Korean conflict, and they have played a vital role in keeping our defenses at adequate strength so that peace has been maintained.

If our country should again be called upon to preserve freedom through war, the enemy will undoubtedly have advanced weapons and armies of trained soldiers. Our insurance of victory and survival will again depend on superior productive capacity for implements of warfare.

While machine tools have long been necessary for the accurate and quantity production of guns, rifles, projectiles, tanks, and other ordnance equipment, they are even more essential today for manufacturing America's new "push-button" weapons and improved arms. Greater complexity of shapes and mechanisms, more exacting tolerance specifications, and resistance of the newer materials to forming and machining are reasons for present production problems.

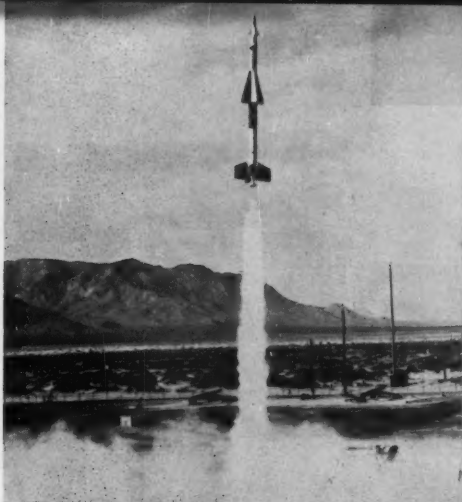
The increased complexity of modern weapons can be appreciated by considering the 3-inch anti-aircraft gun of 1930 which was per-

mitted an average tracking time of five minutes for the 120 mile-per-hour airplane of that period. Today, with an airplane traveling at 600 miles per hour, only one and one half minutes is available for tracking, if the target was detected 15 miles away. Also, in 1930 the shell velocity was more than thirteen times faster than the target, while today it is only three times faster.

This need has resulted in the development of the Skysweeper, an automatic, radar-directed anti-aircraft weapon that can fire 12 1/2 pound shells at the rate of forty-five per minute. The complexity of this amazing weapon has increased production problems many-fold. The fire-control system alone consists of over 12,000 different parts. In each Skysweeper alone there are 572 different, fine-pitch precision gears.

To solve such special production problems, the Ordnance Corps of the United States Army depends on the ingenious application of technical skill by both builders and users of machine tools. The cooperation of the machine tool industry has been of unestimable value in developing constantly improved machines and manufacturing techniques that have increased this country's power to produce.

We of the Ordnance Corps, as well as leaders in the metal-working industry, are looking for-



By Brigadier General J. B. MEDARIS

Chief, Industrial Division
Office Chief of Ordnance
Department of the Army
Washington, D. C.



ward with considerable anticipation to the 1955 Machine Tool Show and the two other shows that will be run simultaneously in Chicago. Here we can see in actual operation the latest results of the ingenuity and resourcefulness of manufacturing equipment builders.

Equipment developments to date have solved many of our special production problems. For example, the availability of heavier presses and better dies have made it possible for us to produce improved quality, high-strength artillery shells from ordinary low-carbon steel by the hot-cup cold-draw process. Other machinery improvements have permitted higher cutting speeds and feeds, and provided greater ruggedness and more flexibility of control. The trend toward automatic control and closer tolerances will permit an even greater degree of interchangeable manufacture and eliminate more and more hand work. We are confident that the experience and skill of the machine tool builders will result in further advances that will continue to lower manufacturing costs and increase this country's industrial potential.

The development of new and improved machine tools is not sufficient to insure our national defense. Such machines must be purchased, built, and delivered to new or expanded facilities for

immediate use. We cannot afford to wait the year or two required in previous wars for revitalization of the machine tool industry. We must continually recognize the vital necessity of a strong machine tool industry, and the availability of sufficient production facilities.

We cannot and should not expect another miracle of conversion to war production. There would not be time for such a conversion. The Ordnance Corps has been taking and is still taking vigorous action to retain its production base and to maintain it in serviceable condition so that it will be ready for immediate emergency production requirements.

Our major hope for future peace is in industrial strength so great and military preparedness so thorough that no enemy nation will attack us. Industrial strength has been a decisive factor in winning past wars, and it can be the most important single element in any future war.

The tremendous increase in productivity—actual output per man-hour—attained in this country has not been achieved by working harder or more skillfully. It is a direct result of expanded production facilities, and our technological skill in devising superior manufacturing techniques and improved machinery that multiplies human effort.

Preview of the Chicago Shows

L & J Presses

Machine Tool Show, Booth 407

Representative models of a straight-side high-speed press and open-back inclinable presses are being shown by the L & J Press Corporation, Elkhart, Ind. The straight-side press is of double-crank design, with a 20-ton capacity and a top speed of 450 strokes per minute. Equipment includes an air clutch with controls for inching, single stroking, or continuous stroking; an adjustable rotary limit switch; an air-release spring set brake; push-button speed controls; flood lubrication with a pressure-controlled switch; thermal limit switches in all crankshaft bearings; a micro switch in the die interlocked with the clutch control; a double roll feed; a by-pass type roll lifter; and a scrap shear and stock oiler.

The No. 5 punch press, of 56-ton capacity, is available with or without back gears. A new frame design gives more rigidity in stress areas to minimize deflection under heavy loads. The model on exhibit is equipped with an air clutch. Another addition to the L & J line is a No. 6 punch press of 65-ton capacity.

Indicate Item 127 on postcard, page 325

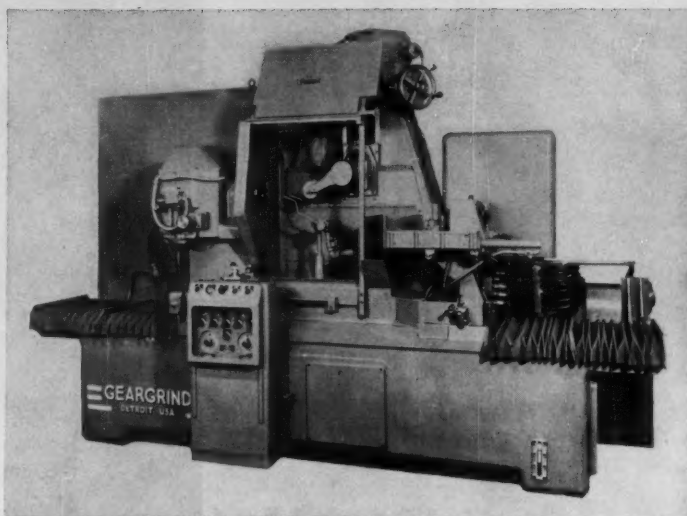


Fig. 1. Fully automatic Geargrind machine with diamond trimmer

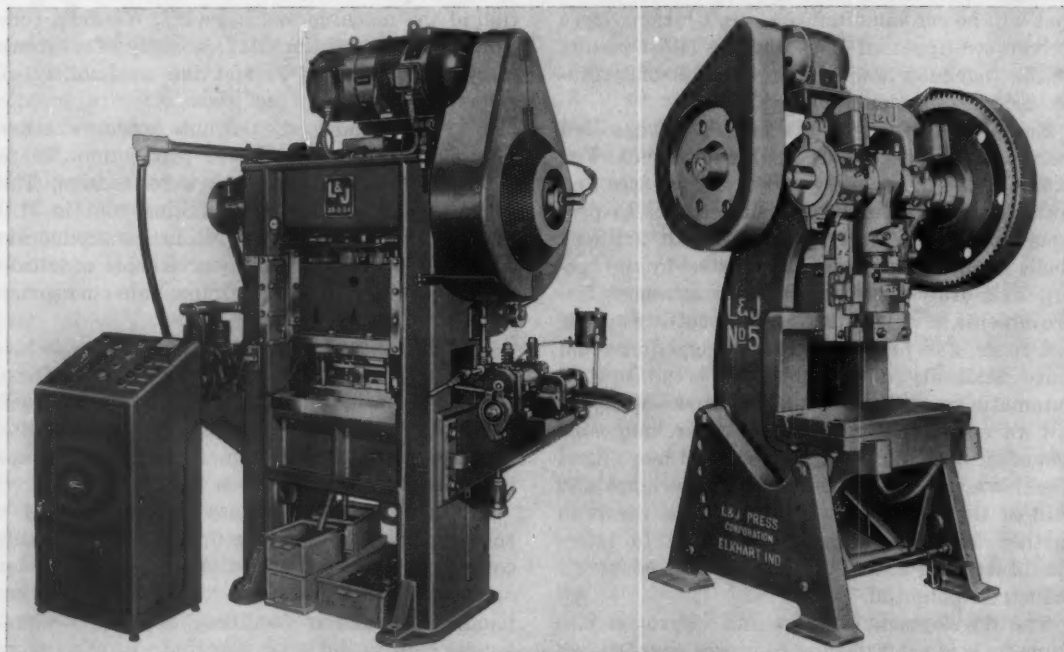
Geargrind and Screwmatic Machines

Machine Tool Show, Booth 315

Among the equipment featured by the Gear Grinding Machine Co., Detroit, Mich., is a high-production, fully automatic gear grinder, Model GG-10X24FA, shown in Fig. 1. This machine uses single or double diamond trimmers to as-

sure a perfect blend between the tooth profile and the root fillet. Coolant through the grinding wheel supplies a controlled flow of fluid to the work area.

The master control panel, Fig. 2, has a transparent cover which pre-



Straight-side high-speed press (left) and open-back inclinable punch press (right) exhibited by the L & J Press Corporation

Preview of the Chicago Shows

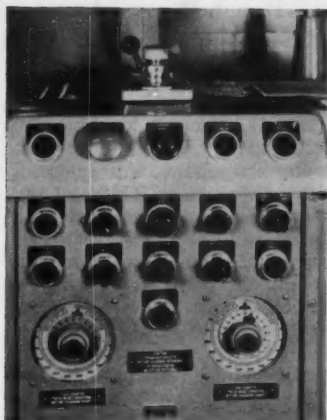


Fig. 2. Master control panel of Geagrind machine has transparent cover

vents the operator from accidentally changing the adjustment. The panel can also be locked to avoid any changes by unauthorized personnel. Controls needed by the operator are in the exposed top of the panel.

Other machines which the company is featuring are a high-production flute or spline form grinder, SG-10X24FAL, that is automatically hopper-fed or magazine-loaded, and the Detroit

Screwmatic 750, a single-spindle automatic screw machine that has infinitely variable spindle speeds. Three different forward speeds can be employed during any cycle of work. All speeds are reversible, eliminating the need for left-hand tools.

Indicate Item 128 on postcard, page 325

Automatic Rockwell Hardness Tester

Navy Pier Show, Booth 116

Latest advances in hardness testing, including a fully automatic Rockwell machine, will be featured by Wilson Mechanical Instrument Division, American Chain & Cable Co., Bridgeport, Conn. By the use of tiny photo transistors and intricate timing mechanisms, the fully automatic Rockwell unit is capable of testing the hardness of both ferrous and non-ferrous metals, in either a hard or soft condition, at the rate of 1000 to 1200 tests per hour.

In automatic operation, the parts to be tested are power-fed into the machine and positioned beneath a diamond penetrator. After the diamond is forced into the part, the resulting hardness determination, which can be read on a

dial, is used to automatically classify the parts according to the desired hardness limits.

Another featured unit will be a semi-automatic Rockwell motorized hardness tester. This device has a short test cycle to permit an increased number of readings to be taken and recorded within a definite time period. A special dial gage, designated "Set-O-Matic," eliminates the necessity of setting the dial bezel for each test.

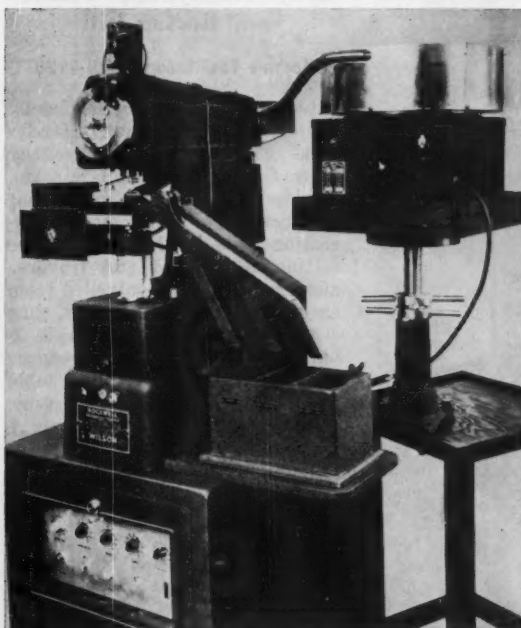
Also to be displayed will be the company's regular line of hand-operated and superficial Rockwell testers, the "Tukon" micro-hardness tester, and accessories for all models including the "Equitron" fixture which is used for holding pieces that are being tested for Jominy hardenability.

Indicate Item 129 on postcard, page 325

Ex-Cell-O Tool Grinders

Machine Tool Show, Booth 1319

A new line of tool grinders will be displayed for the first time by Ex-Cell-O Corporation, Detroit, Mich. Four models comprise the line, ranging from precision grinders with 6-inch diameter wheels to heavy-duty machines with 14-inch diameter wheels. All

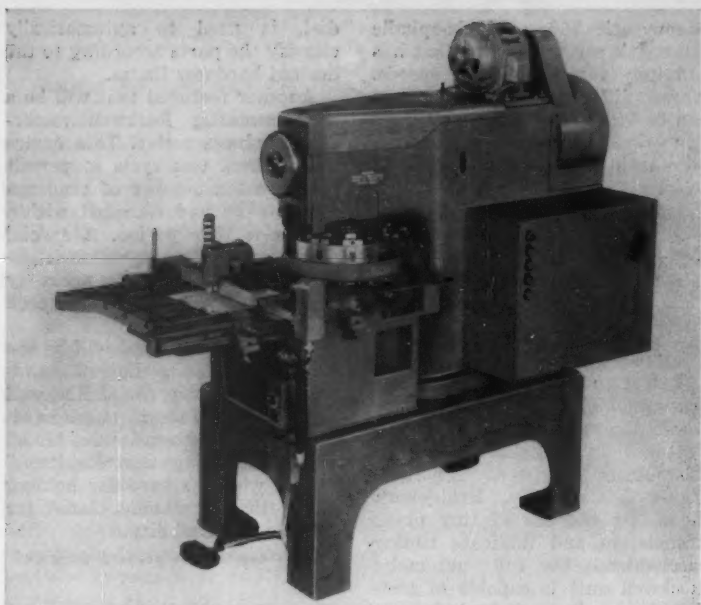


Wilson automatic Rockwell hardness tester equipped with vibratory feeding unit



Precision tool grinding machine to be exhibited by Ex-Cell-O Corporation

Preview of the Chicago Shows



Wiedemann turret punch press for printed circuit boards or metal chassis

are double-end models with reversible motors to provide proper wheel rotation for both left- and right-hand tools. Grinding is done on faces of plate-mounted wheels.

The tool-rest tables are large enough to furnish adequate support, and are easily adjustable to required tool angles. The tables are also adjustable to compensate

for wheel size loss due to wear.

Style 44-A (illustrated) is a precision tool grinder especially suitable for sharpening carbide tools with diamond wheels. A pressure coolant system provides ample fluid for flooding the work, and individual valves control the flow to either side of both wheels.

Indicate Item 130 on postcard, page 325

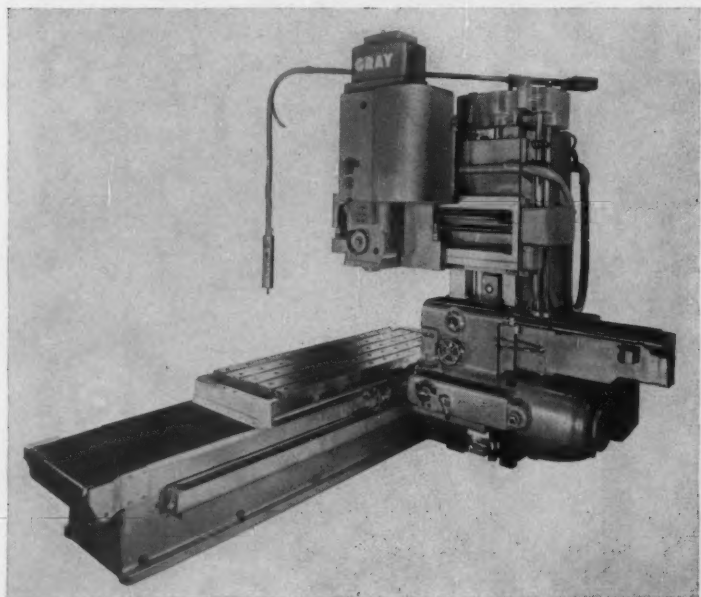


Fig. 1. "Handymill" to be shown by G. A. Gray Co. has built-in chip conveyor

Punch Presses for Short Runs

Machine Tool Show, Booth 1420

The Wiedemann Machine Co., Philadelphia, Pa., will demonstrate its method of piercing without die sets on its line of turret punch presses. These machines are claimed to provide great economy in locating and punching holes in sheet and plate when production volume is low. Shown for the first time will be a 4-ton RA-4P press used in high-speed piercing of printed-circuit wiring boards or metal chassis, and a 40-ton RA-61 press which will be equipped with optical dimensioning instruments so that single-piece jobs or templates can be completed rapidly.

These machines, as well as a 15-ton RA-41P press also on display, have a high-speed follower gage. Work is fastened to the cross-slide and accurately follows its motion as the operator moves a stylus to a series of color-coded holes in a template secured to the table. Holes are located to close tolerances (plus or minus 0.005 inch), and punched at a rate of 30 to 120 per minute.

Indicate Item 131 on postcard, page 325

Gray "Handymill," Planer and Boring Mill

Machine Tool Show, Booth 1120

Lap cuts may be controlled by a simple dial on the new "Handymill," Fig. 1, to be displayed by G. A. Gray Co., Cincinnati, Ohio. A side-head is provided so that milling and precision boring operations can be handled in one setting. Both feed and traverse movements can be controlled from an overhead plastic pendant, thus eliminating levers on the rail. A built-in chip conveyor reduces clean-up time. The main table drive is of the anti-backlash type, and both the machine bearings and table ways are non-metallic. Spindle speeds ranging from 10 to 1000 R.P.M. are instantly available.

The universal planer, Fig. 2, is also to be exhibited. It provides four types of cuts: conventional single cuts in one direction only; double cuts, cutting on both forward and backward strokes; triple cuts, finish-planing while rough

Preview of the Chicago Shows

double-cutting; and, finally, cross cuts—light occasional cross-keyways and corner chamfers planed without extra setting. Quick change from standard operation to double or triple cutting is accomplished by the flick of a lever and the touch of a button.

A completely redesigned horizontal boring, drilling, and milling machine, Fig. 3, will be shown. Tools and cutters may be conveniently secured by means of a push-button actuated power draw-bar. A "Televersal" attachment is claimed to extend the machine range, reduce set-ups, permit low mounting of the work, and make angular cutting easy. Machine handling time is reduced by a built-in crane that is available with a 360-degree swing and a 2000-pound capacity. Quick, precision settings may be read at a glance by means of large ground-glass screens having convenient zero-adjustment verniers.

Indicate Item 132 on postcard, page 325

Kennametal Cutting Materials

Machine Tool Show, Booth 123
Navy Pier, Booth 410

A new general-purpose tool material for cutting steel and a new line of metal-cutting tools will be highlighted by Kennametal Inc., Latrobe, Pa. The material, a sintered carbide designated K21, was designed to give better performance in a wide range of applications. With a Rockwell A rating of 91, it has high edge strength, superior wear quality, and excellent resistance to cratering, according to company reports.

Seventeen styles of Kendex tools in a range of sizes will be on display. Turnover button type tools with throw-away inserts offer a new means of chip control. Replaceable chip-breakers, multiple-edge quick-indexing inserts, and interchangeable elements are some of the features provided. In addition, economy is offered by the elimination of grinding and simplification of inventory. A new series of Kendex tools having positive rake also will be introduced.

Scheduled as part of the exhibit will be a tool grinding service and a demonstration comparing machine parts of steel and Kennametal.

Indicate Item 133 on postcard, page 325

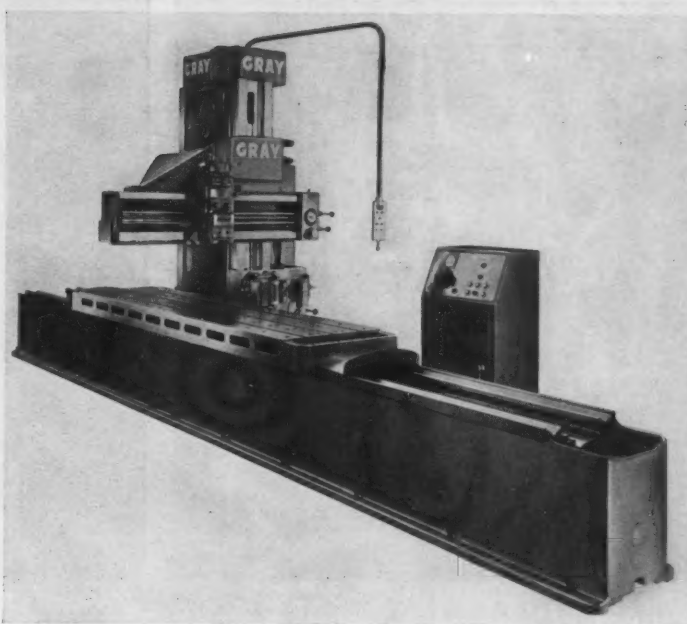


Fig. 2. Gray universal planer cuts on both the forward and reverse stroke in addition to handling light cross-keyways and corner chamfers

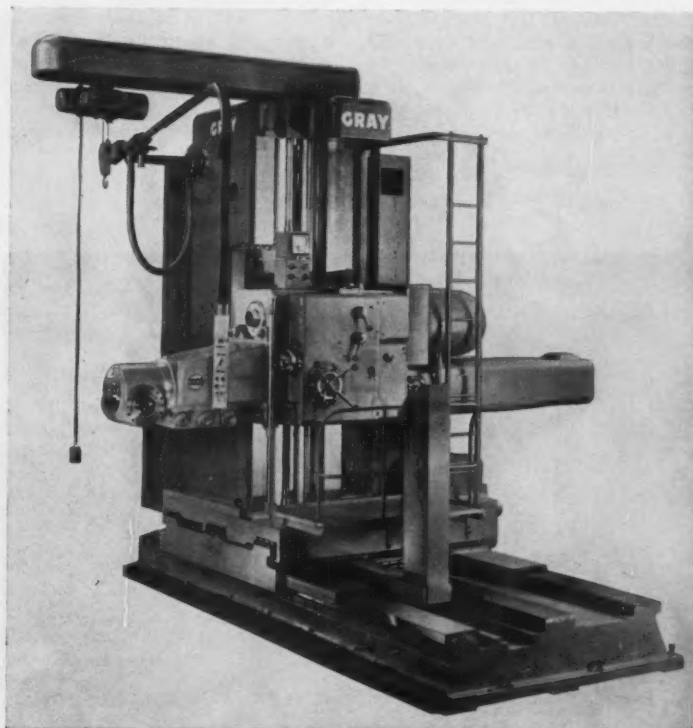


Fig. 3. Integral swinging crane reduces set-up time on Gray horizontal boring, drilling, and milling machine

Preview of the Chicago Shows

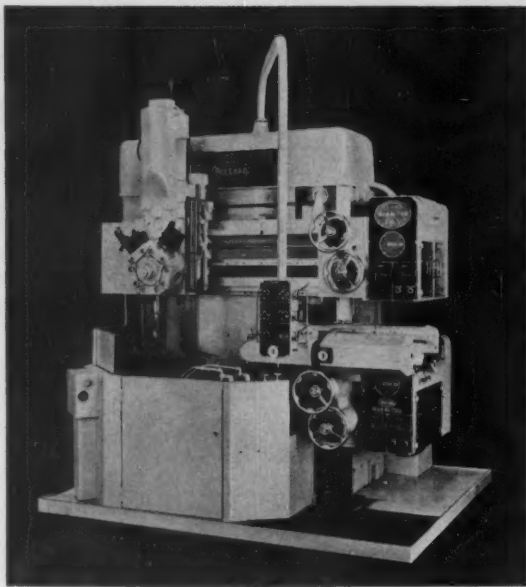


Fig. 1. Bullard turret lathe equipped with Man-Au-Trol

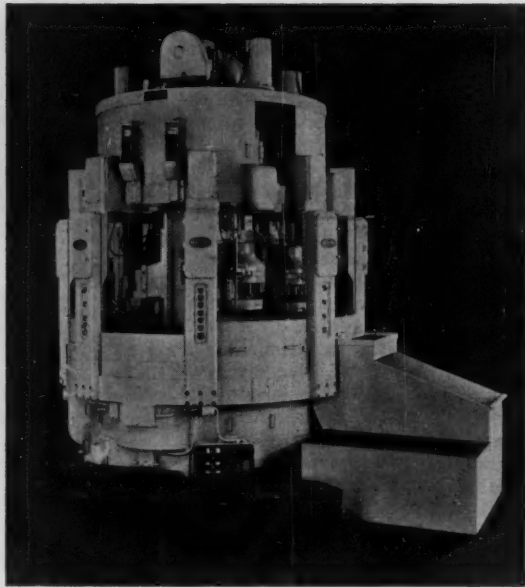


Fig. 2. Multi-Au-Matic vertical-spindle chucking machine

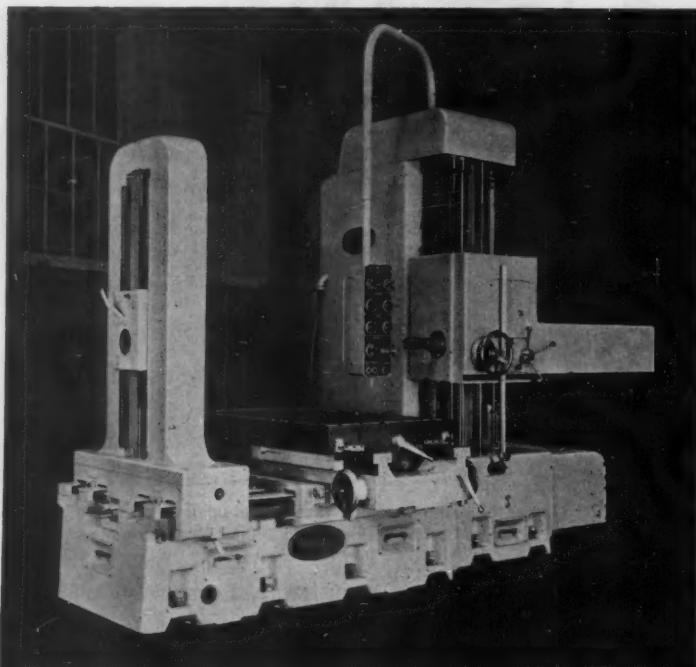
Bullard Vertical Turret Lathe, Horizontal Boring Mill, and Vertical Chucking Machine

Machine Tool Show, Booth 1213

Three of the six machines in the exhibit of the Bullard Co., Bridgeport, Conn., are shown in Figs. 1, 2, and 3. The Model 75 vertical turret lathe, Fig. 1, is a 26-inch Cut Master equipped with a Man-Au-Trol conversion unit

for completely automatic operation. A feature of the machine is a new pendant control for the feed and traverse of all heads, feed selection, table-speed selection, and turret indexing. All heads have screw feed in both directions.

Fig. 3. Model 75 horizontal boring, milling, and drilling machine brought out by the Bullard Co.



The Man-Au-Trol unit, seen on the right-hand side of the machine, consists of two rotary detector drums and a function drum. In effect, the detector drums tell the machine what to do, and the function drum, when and where to do it. The unit can be purchased with the machine, or applied in the field.

A Type L Multi-Au-Matic 14-inch, eight-spindle vertical chucking machine is shown in Fig. 2. Because of higher spindle speeds, a faster indexing mechanism, a new screw feed, and simplified controls, productive capacity is far greater than for previous models. The Show machine will feature an automatic loading device. A ten-inch, twelve-spindle model will also be shown.

An unusual pendant control is also found on the Model 75 3-inch horizontal boring, milling, and drilling machine, Fig. 3. This pendant control enables the operator to select the feed and traverse of the spindle, head, table and saddle, as well as the speed and direction of spindle rotation. It also provides means for actuating the head-binding device. The spindle has both a screw and a rack feed, either of which can be selected by means of a switch on the head. A companion 5-inch machine at the Show, not illustrated, will contain an automatic electronic positioner.

Indicate Item 134 on postcard, page 325

Preview of the Chicago Shows

Jones & Lamson Introduces Automatic Tracing Lathe

Machine Tool Show, Booth 1111

Jones & Lamson Machine Co., Springfield, Vt., will introduce the heavy-duty automatic tracing lathe illustrated. This machine is designed to remove metal to a depth of 1/2 inch in one to four automatically controlled tracing cuts.

A two-position indexing tool-holder on the tracing slide of the carriage permits heavy roughing with one tool and extremely accurate finishing cuts with the other. In a carriage cycle for rough- or finish-facing, or for cutting grooves, a 12-inch back arm can be set to rock in at any moment in the cycle. Tool relief on all finishing cuts is automatic on both carriage and back arm.

Pick-off change-gears give the headstock sixteen spindle speeds with 2 to 1 or 2 1/2 to 1 automatic speed change while the machine is operating. This insures optimum cutting speeds on changing diameters and angles, and permits making a roughing cut at one speed and a finishing cut at another.

The lathe has four flow-control valves and three drums operating

electrical limit switches. Equipment includes a 40-H.P. motor and an integral hydraulic system.

Indicate Item 135 on postcard, page 325

Edlund Drilling Machines

Machine Tool Show, Booth 115

On public display for the first time by the Edlund Machinery Co., Cortland, N. Y., will be the Model 4F drilling and tapping machine for continuous heavy-duty production work, and the Model 1F sensitive drilling machine for light precision work. Added to the present Model 2F, these two new machines will handle a complete range of work capacities, from light- to heavy-duty.

The Model 4F drilling and tapping machine features infinitely variable speeds up to 2200 R.P.M., and a capacity in cast iron of 1 1/2 inches. Designed primarily for heavy-duty drilling and tapping operations on a production basis, this unit has a 12-inch overhang. Pedestal models are avail-

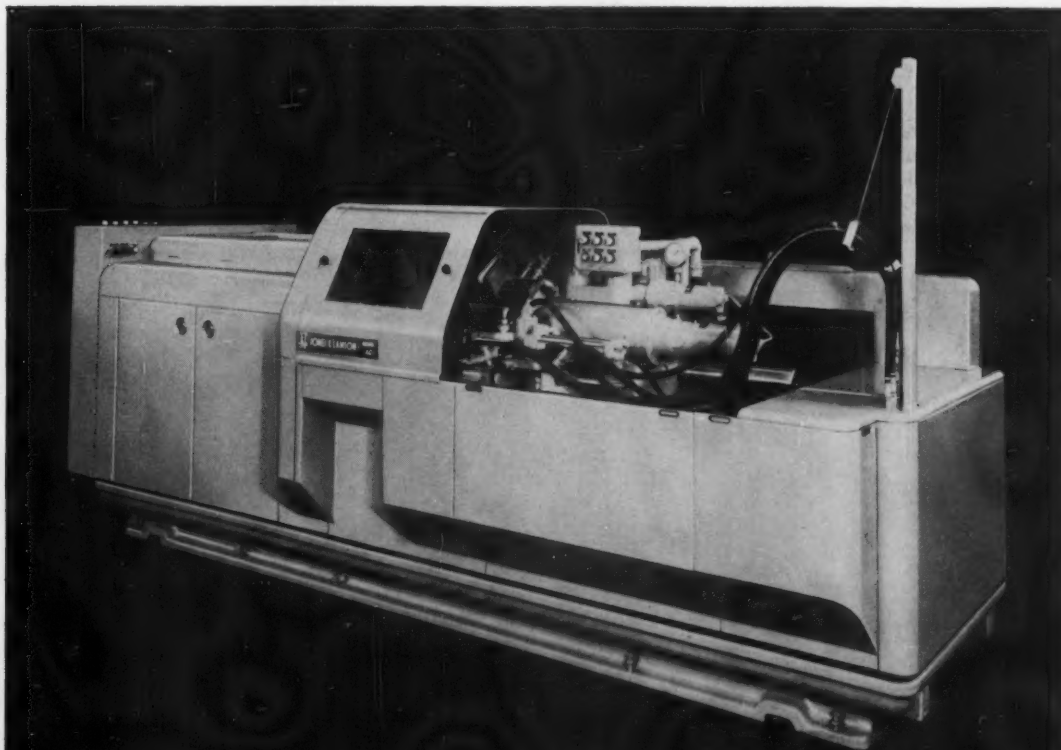


Edlund Model 4F heavy-duty drilling and tapping machine

able with one, two, three, or four spindles.

Several precision operating features on the Model 1F sensitive drilling machine make it especial-

Jones & Lamson heavy-duty automatic tracing lathe uses two-position indexing tool-holder



Preview of the Chicago Shows

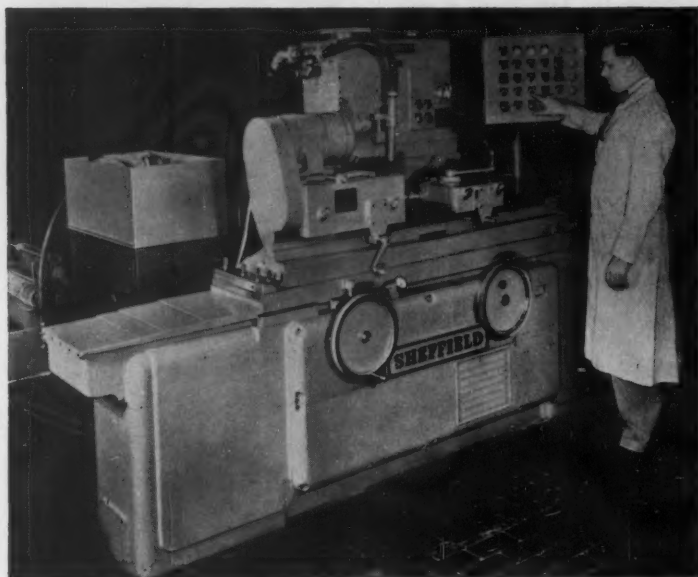


Fig. 1. Crush-grinding machine being introduced by Sheffield Corporation

ly suitable for manufacturers of small parts. A variable-speed drive permits the instant selection of any speed between 1250 and 10,000 R.P.M. An optional range of 625 to 5000 R.P.M. is available. Other features are a pre-positioned micrometer depth gage for controlling drill penetration, and an

adjustable spindle-tension control to give the operator the exact feel when drilling different materials. This model has a 7-inch overhang with a 3/8-inch capacity in cast iron, and is available in one-, two-, three-, four-, and six-spindle bench and pedestal models.

Indicate Item 136 on postcard, page 325

Sheffield Form Grinders, Comparator, Threading Unit, and Centering Machine

Machine Tool Show, Booth 1305

Three new grinding machines will be displayed by the Sheffield Corporation, Dayton, Ohio. The

Model 180 Multi-Form machine, Fig. 1, has been designed expressly for crush grinding. It uses a

4-inch wide wheel, and can accommodate work 10 inches in diameter and 24 inches long. Integral controls automatically bring parts to size. The machine contains a Crushtree wheel dresser, variable wheel-feed control, and an automatic plunge-wheel device with a rapid approach and retraction.

Model 109 annular grinder rapidly crush-grinds circular form-tools, ball-bearing seals, seaming rolls, "O" rings, and similar parts. The machine has a capacity of 12 inches between centers, and is available with a live- or dead-center work-head. An adjustable timer provides automatic crush dressing of the wheel after a predetermined number of cycles.

Model 134 grinder is a completely new machine for producing precision threads and forms on taps and small parts. It has a relieving attachment for taps, and can grind from 20 to 120 threads per inch on work up to 1/2 inch in diameter and 3 inches in length.

Among the many other Sheffield products on display will be an electronic gage-block comparator (Fig. 2), a Murchey threading unit (Fig. 3), and a centering machine (Fig. 4). The comparator has an amplifier, and calibrates gage-blocks to reference masters to an accuracy of several millionths of an inch.

The threading unit, Model 300 Precision-Pak, is individually powered and can be mounted in any position from horizontal through vertical. It can cut internal threads from 1 1/8 to 4 inches, and external threads from 3/4 to 3 1/2 inches. The unit can also be used for boring and reaming.



Fig. 2. Sheffield electronic gage-block comparator

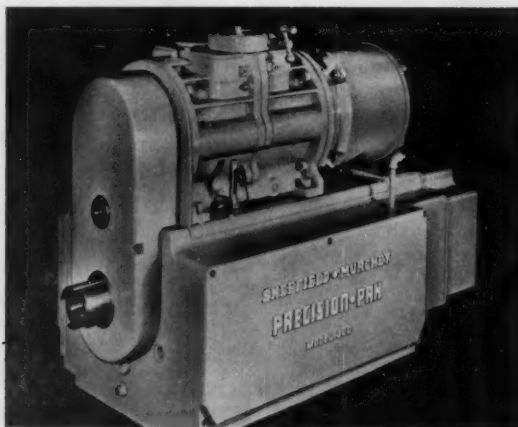


Fig. 3. Sheffield-Murchey threading unit

Preview of the Chicago Shows

The centering machine is quick-acting, and can accommodate round bars from 1/2 to 3 inches in diameter. Center drills up to 1/2 inch in diameter can be used.



Fig. 4. Sheffield-Murphy centering machine

Maximum spindle stroke of the machine is 1 1/2 inches. Indicate Item 137 on postcard, page 325

Ajax Forging Equipment

Machine Tool Show, Booth 1309

Three types of forging equipment are being demonstrated by the Ajax Mfg Co, Cleveland, Ohio. These machines, which include a 500-ton forging press, a No. 0 forging roll, and a 3-inch forging machine, incorporate the latest features of the respective lines.

Indicate Item 138 on postcard, page 325

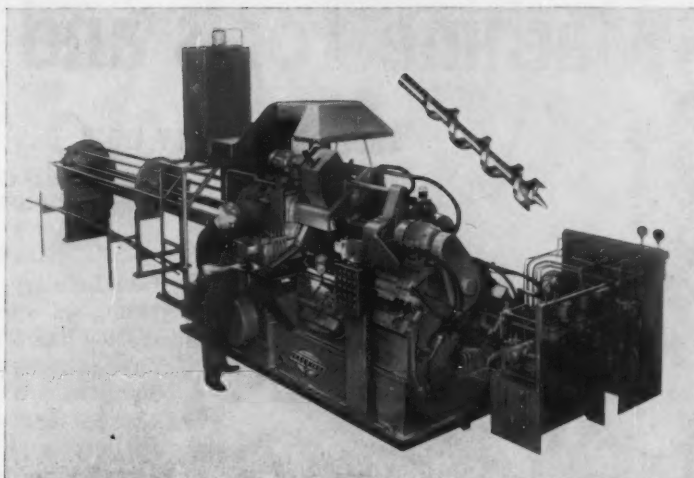


Fig. 1. Greenlee automatic miller produces solid-center auger bits

Greenlee Auger-Bit Machine and Bar Automatic

Machine Tool Show, Booth 1221

To be shown for the first time by Greenlee Brothers & Co., Rockford, Ill., is an auger-bit miller, Fig. 1, for automatically producing solid-center auger bits from bar stock. The machine will be under full production, making semi-finished auger bits, including the spiral-milling and heading.

A 1-inch, six-spindle automatic bar machine, Fig. 2, will be tooled for a work-piece requiring such operations as drilling, reaming, lead-screw tapping, forming, recessing, shaving, stenciling, and thread rolling. The machine is equipped with new ball-bearing,

high-speed spindles and an air feed arrangement for feeding out the bars. There will also be an exhibit of standard attachments and tool-holders for Greenlee automatics.

The tool division of the company will be represented by hydraulic benders for pipe, tubing, and rigid conduit. In operation will be a fast-acting bender, capable of bending extra-heavy pipe up to 5 inches in diameter and a new light-weight bender for conduit and pipe up to 2 inches in diameter.

Indicate Item 139 on postcard, page 325

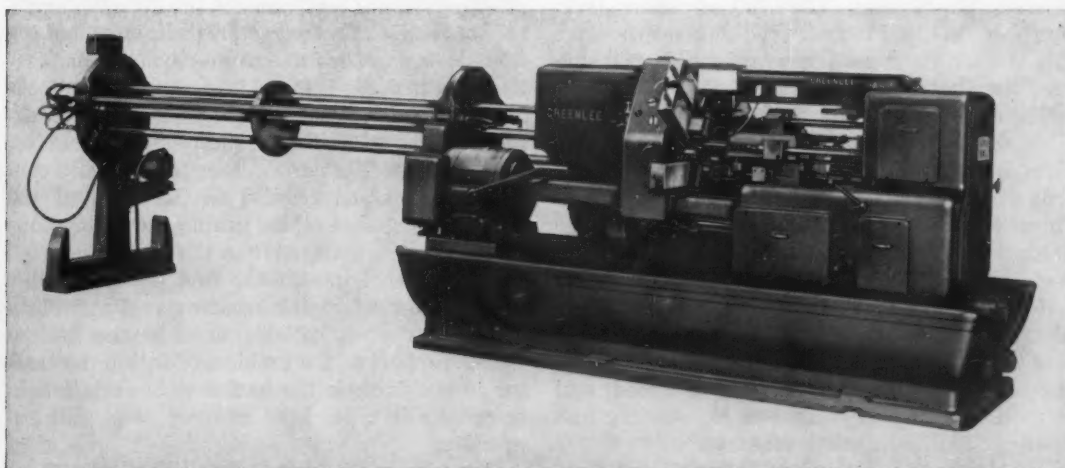


Fig. 2. Six-spindle, 1-inch bar automatic with high-speed spindles and air feed

Machine Tools and the Farm

By MARK V. KEELER

Vice-President, International Harvester Co., and
Executive Head, Farm Tractor Division

OF the 165,000,000 consumers of food and fiber in the country, probably only a very tiny fraction ever think of the products they consume as being made possible, in large part, by machinery builders—producers of machine tools and allied manufacturing equipment.

Stated another way, International Harvester (and its competitors in the farm tractor manufacturing industry) can be imagined as a sort of transformation agency which turns the machine tool of the machinery builder into a machine tool for the farmer. For the farm tractor is a machine tool. The farmer does not buy it for show or pleasure; he buys it in order to produce his product, to make his processes more efficient, reduce his man-hours and his costs—in short, to make a profit for himself.

We do not deny that in our processing we need more than machine tools. For we do bring a certain amount of managerial direction to the forces we employ, we rely on metallurgists for newer materials, on engineers for design, on skilled employes for fabrication, and so on. *But the machine tool is basic to our way of life.*

International Harvester has been producing tractors for the last half century. We have experience with and currently produce every major type of farm and industrial tractor that is known and used. We have built more than 3,000,000 tractors. More than 2,000,000 of these tractors were of the Farmall type and we consider this tractor the most important single machine ever placed at the service of the world's farmers.

The manufacture of farm tractors is, perhaps, even more dependent upon machine tools than farm implements because of the higher standards of precision required, and the need for engines and transmissions which can only be produced by machine tools of high quality and performance. The farm tractor is not merely a self-propelled vehicle, but a complicated power plant with means of transferring power to coupled implements, with hydraulic devices for lifting and applying pressure to attached and coupled implements; with electric starting and lighting; and with other features.

A half century ago when International Harvester was a pioneer in the farm tractor produc-

tion industry, we produced a tractor with a rating of about ten horsepower. Today our tractor line consists of 62 models whose horsepower ranges from 9.7 to five times that figure. In these five decades other equally important changes and improvements have occurred in the tractor although they may not be so easily described in dramatic terms such as a five-fold increase in horsepower. But the improvements in the metal-working end of the tractor business have one thing in common—a better and better tractor could not be built and marketed without better and better machine tools.

The changes and improvements wrought in the farm tractor over the years have been the kind of steady, year-in and year-out advance that customers have come to expect from any progressive industry. True, there have been climactic years such as 1923 when the Farmall tricycle type tractor was introduced—a machine which revolutionized farming and the tractor manufacturing industry, and made possible the mechanization of row-crop farming. But this should not obscure the steady and insistent improvement in variety and versatility of farm tractors supplied to meet the demand of farmers.

A continual demand for more capacity in what had become the primary power plant on the farm was caused by an easily observed but often overlooked fact, namely, the farm obviously cannot be fitted to the tractor, the tractor and the farm tools must be fitted to the farm. Mechanization of the farm began 124 years ago in Rockbridge County, Va., when Cyrus Hall McCormick perfected the first successful mechanical grain reaper. Mechanized farming was not confined to that one county; in the form of the reaper it spread to all the grain growing sections of the United States. When the tractor started replacing the horse in the first decade of this century, power farming became a real possibility for almost every tillable acre in the United States. So part of the problem of fitting the tractor to the farm is the nation-wide variation in terrain, soil type, kind of crop, and cultural practice.

Farms come in many different sizes. There is more work as well as a different kind of work

on some farms. To indicate the possibility of a change in this element of the problem it should be noted that the number of farms is declining but the number of acres under cultivation is not—hence some farms are getting larger and larger.

The number of people on farms continues to decline so that there are fewer people to do the work and more must be done by machines. In 1930, about 25 per cent of the nation's population lived on farms and last year, 13.5 per cent. At the end of twenty-five more years, it has been estimated, only 8 per cent of the population will be living on farms. A significant sidelight on the farm population part of our problem is the fact that the age of farmers is increasing. In the twenty years between 1930 and 1950, the proportion of farmers under the age of 35 has declined almost 5 per cent while those aged 55 and more has increased 6 per cent.

From this it can readily be seen that horsepower in the farm tractor is developed and increased not for the sake of winning a power race but to channel it into useful, productive, and efficient mechanical effort. A wide range of power output is needed to help solve the problem presented by a wide difference in crops, terrain, soil, and size of farm. We know that more power is needed generally in the face of fewer men and more acres to till. In all likelihood, this is not the end—farmers will need and demand even greater horsepower in the future.

As the modern tractor has evolved we have put more and more features and attachments on it. The tractor of today has all kinds of hydraulic devices to make it more efficient and to reduce the effort involved in operating it and to save the farmer's time. The tractor of tomorrow will have newer and more precise hydraulic controls. And those controls will be doing more and different things from what they are doing today. This means that the tractor manufacturer today has to meet more exacting requirements in the form of dimensions than he has ever been called on to meet. He must rely on the machine tool for the accuracy demanded of him when he is producing in quantity.

Today our farm tractor provides a new transmission in the form of a torque amplifier. It cuts the farmer's working time by making it possible to increase or decrease intermittently the pulling power of the tractor without stopping to shift gears. Thus, the farmer's day may be shortened and his productivity increased. But note that fifteen years ago we would not have been able to produce this improved transmission on a practical production basis at a cost that would permit a satisfactory selling price. Our problem was to improve our machining pro-



cedures so as to maintain the close tolerances required and, at the same time, reduce the labor hours needed to manufacture such a transmission. In the past it has been difficult to reconcile precision manufacturing with acceptable manufacturing costs. The automatic machine tools of today are making this possible. And this is progress.

Example after example could be recited showing that progress in farm tractor production has only been possible because the machinery used to build the tractors has kept the modern pace. You have only to consider that today, as opposed to a yesterday of some time ago, we manufacture parts of the farm tractor to 0.0001 inch. We have polished surfaces never required before. We use micro-limit gages on our work. Production machinery has to be that good.

We intend to build a better farm tractor in the future—the farmer will need it and want it. Our objective will be to obtain tools that will permit us to build that tractor for the farmer at a cost which will permit him to buy it, use it, and make money in the using. We surmise that his ultimate aim will be to produce food and fiber, and market them at a price which will fetch him a profit for his own risk taking by selling his commodities in a free market without having to rely on a subsidy of any kind.

There is a challenge here for machinery men to keep machine tools on the farm.

Preview of the Chicago Shows



Fig. 1. Completely new 42-inch Cincinnati all-steel shaper

Cincinnati Features Shapers, Press Brakes, and Shears

Machine Tool Show, Booth 1105

Among the shapers, press brakes, and shears to be exhibited in action by the Cincinnati Shaper Co., Cincinnati, Ohio, will be a completely new 42-inch, all-steel shaper shown in Fig. 1. This machine has a triangular, Corten ram with a 44-inch maximum stroke. Selection by dial of sixteen constant cutting speeds from 25 to 400 feet per minute is possible while the ram is either idle or in

motion. Energy is recovered on the reverse stroke, which results in smooth action at high speeds while relieving clutches of reverse load. The shaper has a full helical, constant-mesh transmission with hydraulically operated clutches.

Other features of this machine include: single lever control from either side of shaper with instantaneous reverse at any point in the stroke; five angular feeds with ro-

tating table for accurate shaping of any angle; an automatic tool lifter; pressure lubricated phenolic ways accurately scraped to precision bearings; Nitralloy-steel drive screw and hard-bronze nut; 150 pounds pressure per square inch for internal lubrication and control of shaper; and hardened and ground elevation and cross-fed screws.

The 16-inch rigid shaper, Fig. 2, introduces a new series to the Cincinnati line. This machine features a nodular iron, slot-free ram that does not require clamping of stroke adjustment. A compensating nut on the ram adjustment automatically eliminates end play. Also featured are: a brushless electromagnetic brake and clutch requiring no adjustment; lubrication at 50 pounds pressure per square inch; an automatic tool lifter; and a hydraulic follower.

Among the four press brakes to be shown in action demonstrating forming, punching, notching, rolling, embossing, and other operations will be the 2-30 and 3-50 series press brakes. The latter, shown in Fig. 3, has a capacity of 50 tons and will bend 6 feet of 10-gage mild steel. It has a 3-inch stroke; a 5-inch power adjustment for the ram as standard equipment; and a 12-inch gap. The 2-30 series machine has a 2 1/2-inch stroke; a 4-inch ram adjustment; a 9-inch gap; and a 30-ton capacity for 6 feet of 14-gage mild steel.

Both press brakes have these

Fig. 2. A 16-inch rigid shaper for heavy cutting

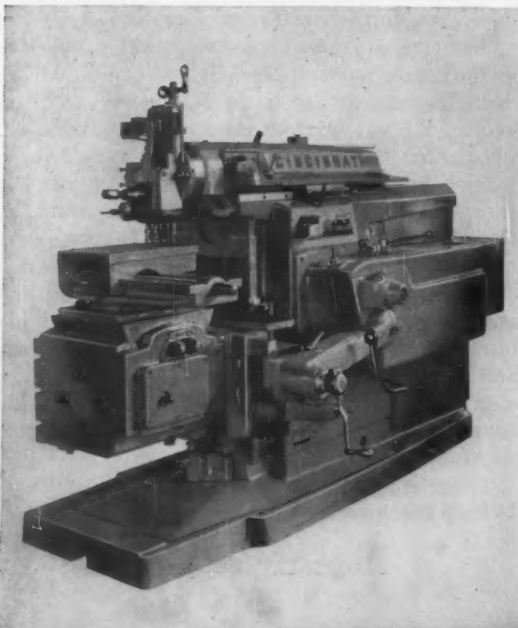


Fig. 3. All-steel press brake of 50-ton capacity



Preview of the Chicago Shows

standard features: front controlled variable-speed drive at 20 to 50 strokes per minute; micrometer ram-adjustment indicators at both ends of the ram for accurate settings; ram and bed planed and drilled for angle brackets; totally enclosed transmission which runs in oil; and a bronze swivel end-guide bearing for endwise alignment. The machines may be adjusted for tilting the ram quickly for fadeout work. The filler block is arranged for positive clamping and alignment. There is a 12-inch space for interchangeability of dies on the larger machines.

The third press brake to be exhibited, illustrated in Fig. 4, is the new 9-115 series, having a capacity of 1/4 inch by 10 feet of mild steel. This machine has twin-drive gears which run in oil; a 12-inch bed and ram extension on each end of the machine; and two tonnage indicators, with an automatic overload release connected to the right-hand indicator. The bed and ram are planed and drilled for five 3/4-inch angles.

Other features are the following: a 4-inch stroke; 12-inch shut height; 12-inch throat; and two-speed attachment. This machine also has micrometer indicators on the ram; a bronze swivel end-guide bearing for endwise alignment; automatic locking of ram adjustment; and an adjustment for tilting the ram quickly for fadeout work.

The largest press brake Cincinnati has ever exhibited at a machine tool show is a 900-ton machine with a bending capacity of

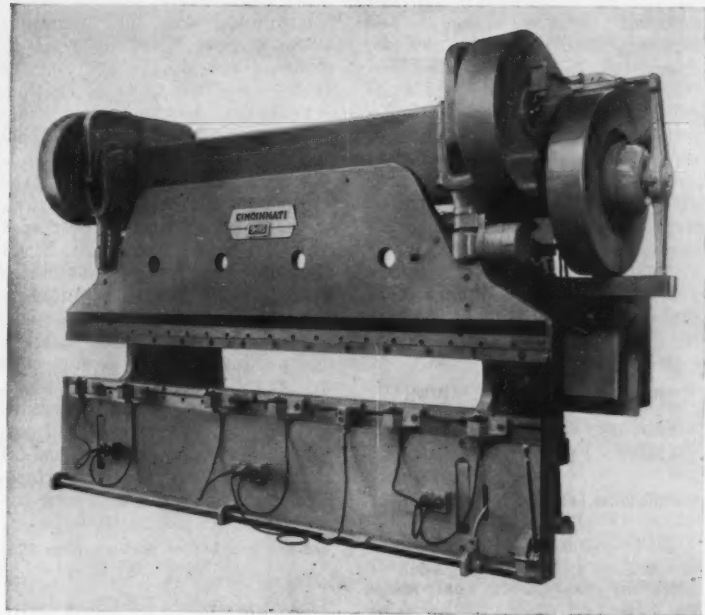


Fig. 4. Cincinnati press brake featuring twin-drive gears

1 inch by 12 feet of mild steel. Two models of the company's line of all-steel shears will also be shown. One shear will be a Series 1410, with a capacity of 3/16 inch by 10

feet of mild steel, and the second shear on exhibit will be a Series 10008, having a cutting capacity of 1 inch by 8 feet of mild steel.

Indicate Item 140 on postcard, page 325

Moline Line of Drilling Machines

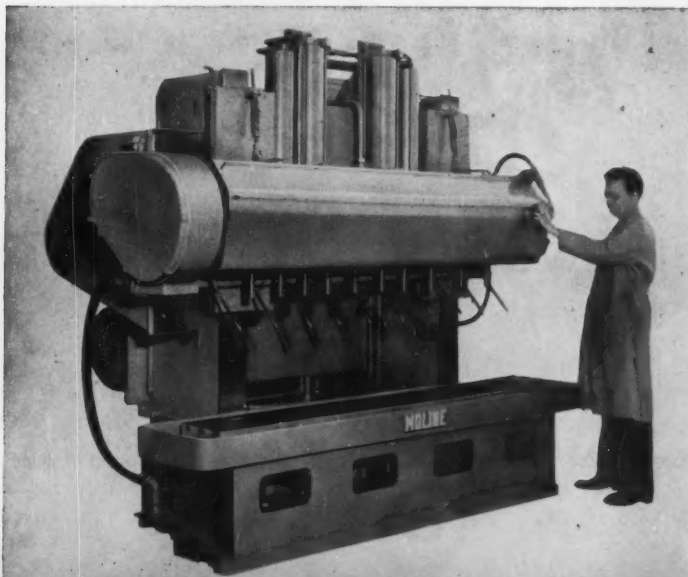
Machine Tool Show, Booth 1304

Moline Tool Co., Moline, Ill., will exhibit a Model HU 110 vertical, universal joint type drilling machine of completely new design.

The drive unit contains twenty-four spindle drivers, each with a separate two-speed-and-neutral adjustment. Pick-off gears are available to permit changing the overall speed range. Gearing in this twenty-four-spindle unit is so designed that full power of the driving motor can be taken through either the right- or left-hand group of twelve spindles without overloading. With no changes in construction, the entire spindle drive unit is applicable for drilling in a vertical, horizontal, or any intermediate position. The drilling area is 15 by 24 inches and the hydraulic feed, 18 inches.

An improved straight-line type drilling machine, having hydraulic rail feed, is equipped with eight spindles which can be adjusted along the machine rail to obtain various center distances. Maximum center distance between the two spindles at each end of the line can be set at 6 feet, with the minimum center distance between

Straight-line drilling machine to be displayed by Moline Tool Co.



Preview of the Chicago Shows

adjacent spindles being 2 1/2 inches. Spindle speeds can be changed by means of a four-speed quick-change gear-box. For a higher or lower range of spindle speeds, pick-off type gears are included. The rated capacity of each spindle is a 7/8-inch diameter drill in mild steel. Spindle units of larger or smaller capacity, having various minimum center distances between adjacent spindles, are available and easily applicable to this machine. Total rated capacity is thirty-two 3/8-inch diameter drills in mild steel.

Indicate Item 141 on postcard, page 325

Oliver Face-Mill Grinder

Machine Tool Show, Booth 604

A hand-operated face-mill grinder will be introduced at the Show by the Oliver Instrument Co., Adrian, Mich. The machine has been designed specifically to facilitate the grinding of close-pitch face mills. It can accommodate face mills 4 to 24 inches in diameter, made of either tungsten-carbide or high-speed steel.

To permit easy set-up, the base table is equipped with hardened tracks operating on steel balls. A heavy ram, also operating on steel balls, provides free movement of

the grinding unit. The grinding-wheel spindle, driven by a 1-H.P. motor, tilts up to 90 degrees each side of the vertical position. A cross carriage provides a transverse movement of the head assembly.

The cutter is mounted on the faceplate of a revolving fixture, and is automatically centered over the supporting ways. Error through wheel wear is eliminated by a diamond dresser mounted on the machine pedestal. A cup wheel is used. Other equipment exhibited by Oliver includes an improved drill-point thinner, drill pointers, die-making machines, a radius grinder, a universal tool and cutter grinder, a template tool-bit grinder, and an automatic face-mill grinder featuring a new hydraulic feed.

Indicate Item 142 on postcard, page 325

Developments of Cleveland Tapping Machine Co.

Machine Tool Show, Booth 409

The exhibit of the Cleveland Tapping Machine Co., Canton, Ohio, will include the three recent developments illustrated. In Fig. 1 is shown a Series F machine for tapping pipe fittings. Fully automatic operation of

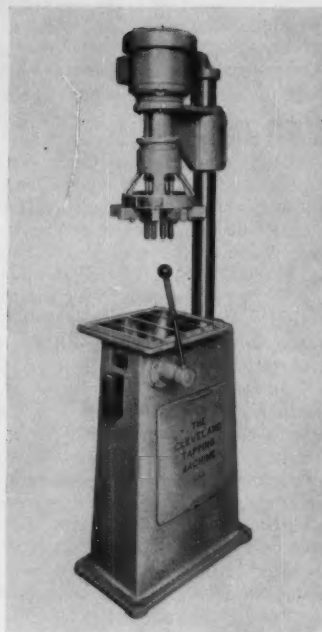
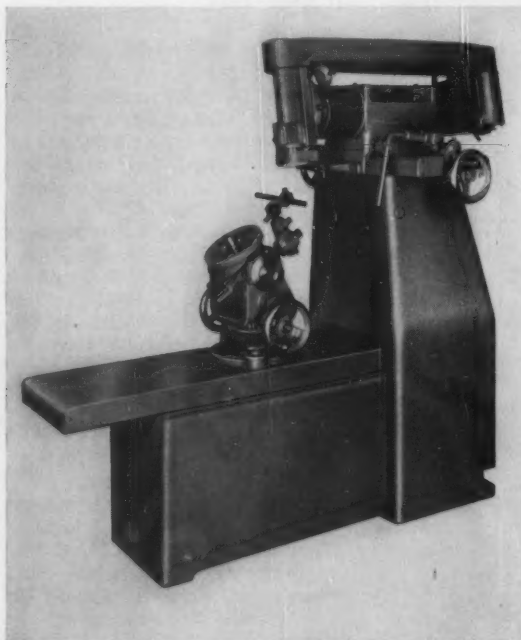


Fig. 2. Cleveland Jr. tapper features up-feed of table

this equipment is produced by combining a lead-screw feed of the tap, an unusual means of feeding the work, and an air-operated, self-compensating holding devices. By using vertical



Face-mill grinder brought out by Oliver Instrument Co.

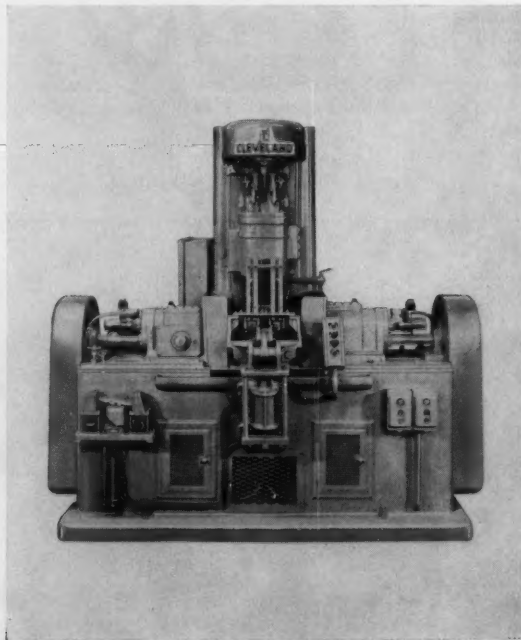


Fig. 1. Lead-screw automatic pipe fitting tapping machine

Preview of the Chicago Shows

and horizontal spindles, it is possible to tap both holes in two ells, or all three holes in one tee, in a single operation. Fitting blanks are stacked in hardened steel ways from which they are pushed into tapping position and clamped by air pressure. When the tapping cycle is completed, the clamps are released, and the fittings delivered to tote boxes.

A Cleveland Jr. multiple-spindle drill tapper, Fig. 2, is offered for multiple small-hole drilling and tapping. It can be furnished with either an adjustable or fixed center distance head. In operation, the table is raised to engage the tools and feed them into the work. To compensate for variations in the weight of different work and work-fixtures, the table carries an adjustable spring balance. A reversing type motor is used.

The power-driven automatic index-table, Fig. 3, provides a positive means of locating work for drilling, tapping, and other sequential operations. Motion is imparted by a large-diameter, needle-bearing cam-follower operating in ways faced with wear plates. A precision lock-pin enters the ways



Fig. 3. Cleveland power-driven automatic index-table for sequential operations

before the cam-follower leaves them, making it impossible for the table to be free-wheeled or mis-indexed. Tables are made in two sizes, 21 inches and 34 inches, with six, eight, or twelve stations.

Indicate Item 143 on postcard, page 325

Optical Measuring and Inspection Equipment

Navy Pier, Booth 864

George Scherr Optical Tools, Inc., New York City, will have on display a representative part of their line of optical measuring and inspection equipment. One of the units to be shown is the Leitz master optical dividing head seen

in Fig. 1. This head is calibrated in 5 seconds of arc length, with a fraction of this amount being easily estimated. Accuracy is claimed to be within 1 second of arc length. This accuracy is due to two features: double, spherical ball bearings, and reading of the master scale by double microscope tubes converging in a common eye-piece.

A new toolmaker microscope, Model UWM, with a measuring capacity of 6 by 2.35 inches, has been added to the Leitz line of optical measuring instruments. This microscope, Fig. 2, features an intermediate image system of optical comparison against built-in master charts. The work-table incorporates a graduated 360-degree rotary measuring stage. By means of a vernier, the stage can be set within 3 minutes of arc length.

Also to be displayed will be the Leitz linear measuring "Perflectometer," the functioning of which is based on a principle of contactless measurement by means of a ray of light; the Wilder micro-projector; the Leitz micro-hardness tester; and other equipment.

Indicate Item 144 on postcard, page 325

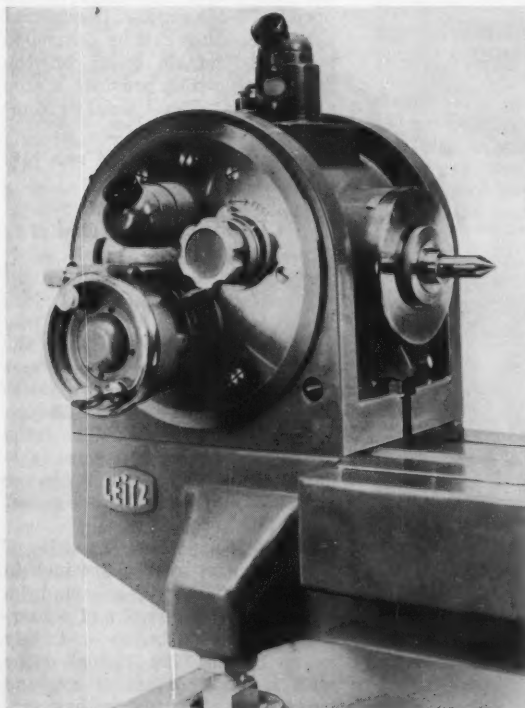


Fig. 1. Optical dividing head to be exhibited by George Scherr Optical Tools, Inc.

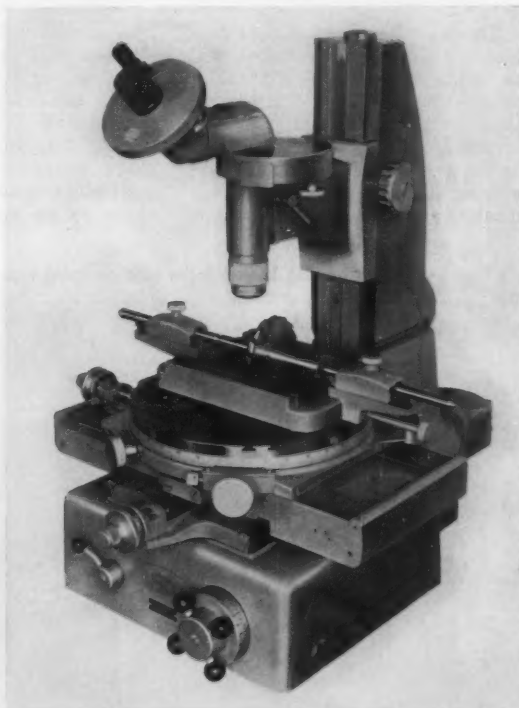
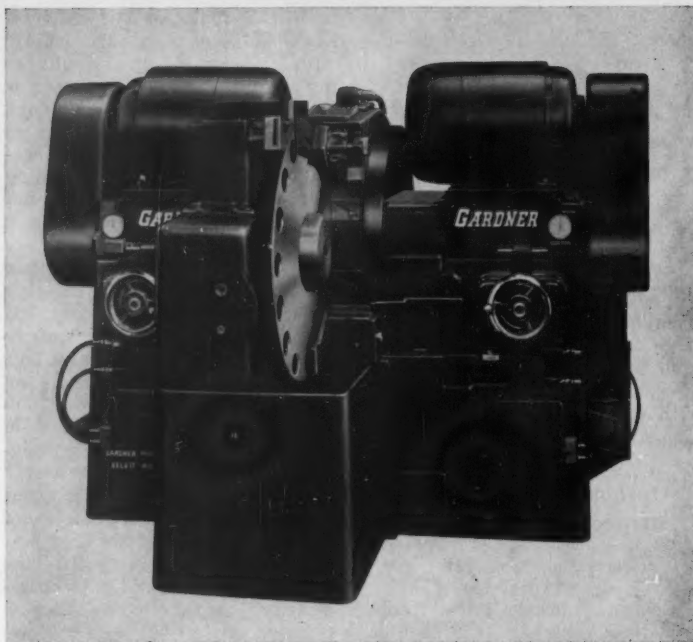


Fig. 2. Large capacity Leitz toolmaker microscope with a rotary measuring stage

Preview of the Chicago Shows



Gardner 30-inch double-disc grinder with automatic loading and unloading

Gardner Features Double-Disc Grinders

Machine Tool Show, Booth 1115

Three double-disc grinders performing different operations will be featured by the Gardner Machine Co., Beloit, Wis. Pump gear blanks will be parallel ground at the rate of 885 parts per hour on the new Model 2H30 double-disc grinder here shown. This 30-inch machine is designed for automatic

loading and unloading, automatic size control, and with a rotary work-carrier.

A Feedall hopper feeder loads work-pieces on the machine by means of an elevator with a roll-chute delivery. Parts are pneumatically transferred from the roll chute to an eighteen-station ro-

tary carrier which handles 594, 780, or 885 ground parts per hour, depending upon the speed setting on the carrier drive.

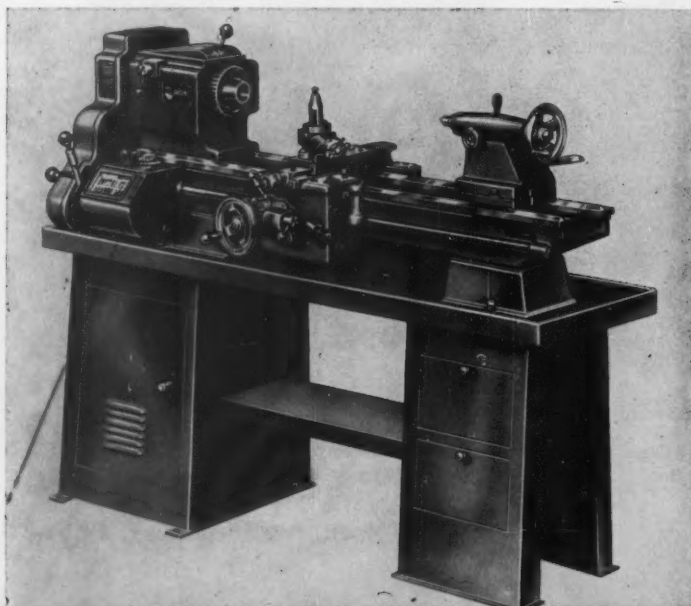
Main features of the grinder include a new spindle design which increases rigidity at the rim of the 30-inch disc by 500 per cent, and a head zeroing indicator which simplifies tilt and swivel adjustment. Automatic size control is obtained by means of a Sheffield dual, open-jet system, and a single Plunjet and gaging anvil.

The Model 2V18 will be shown grinding small ceramic switch starters. Designed to grind a large variety of small parts, the machine uses easily interchanged 34-inch diameter work-carriers. Surfaces are ground by two special Gardner 18-inch Yellow Rim abrasive discs. Sizing control is by means of manual adjustment of the head feed through two handwheels.

Performance of a Model 125 horizontal 30-inch, double-disc grinder in grinding die-cast aluminum torque converter housings will also be demonstrated. The conventional weights that hold the heads in closed position have been replaced in this model with the individual cylinders which open the heads rapidly. Distance of a head opening can be controlled by an adjustable collar on the feed screw which provides a stop arrangement. Two special Gardner abrasive discs are used.

Indicate Item 145 on postcard, page 325

Clausing 12-inch lathe with pedestal mount



Clausing Lathe and Drill Press

Coliseum, Booth 515

Highlights of the exhibit by the Clausing Division, Atlas Press Co., Kalamazoo, Mich., are a Series 6300 12-inch lathe and an 18-inch heavy-duty drill press. The lathe has a tapered key-lock nose, a 1-inch collet capacity, a quick-change gear-box, and a No. 3 Morse socket in its tailstock.

The drill press has a capacity of 1 inch in cast iron or 3/4 inch in steel. Other features include a 6 1/2-inch quill travel and a gear-driven power feed. Also on display are a Series 5300 12-inch lathe with a countershaft clutch and brake, and a vertical milling machine that can be adjusted to an angle with the work.

Indicate Item 146 on postcard, page 325

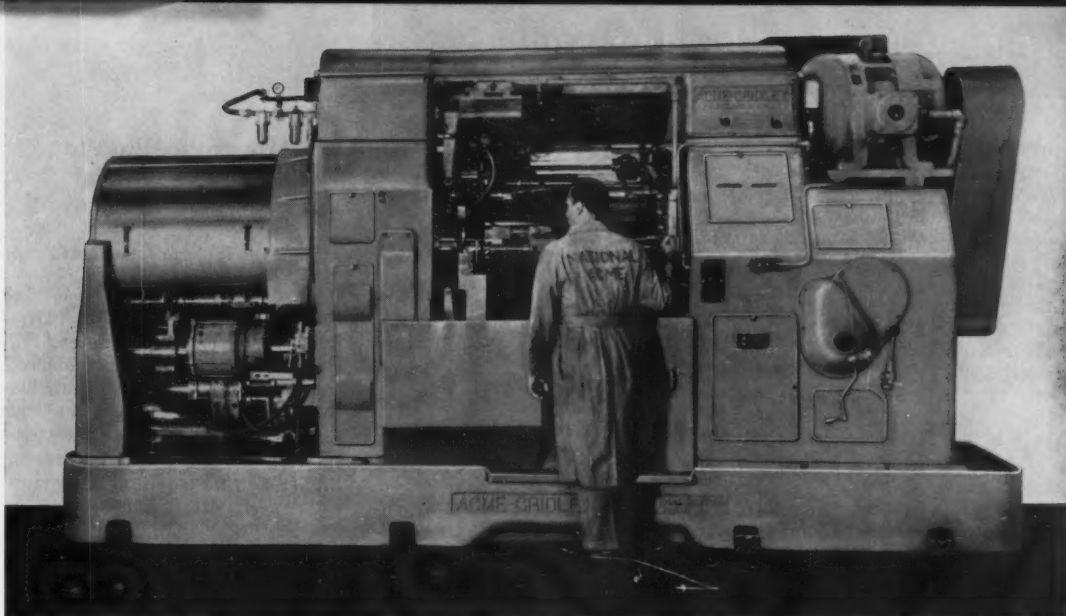


Fig. 1. A 4-inch, eight-spindle bar automatic, one of the largest capacity production machines of this type

National Acme Features Three Automatics

Machine Tool Show, Booths 705 and 324

Three of the newest Acme-Gridley bar automatics built by the National Acme Co., Cleveland, Ohio, will be on display. Viewed for the first time will be a 4-inch, eight-spindle automatic, Fig. 1, one of the largest capacity production machines of this type. It has a standard spindle-speed range of 56 to 464 R.P.M. In the Show demonstration, the machine will be completely tooled with carbide and will produce two bearing races simultaneously from SAE 52100 steel tubing in a cycle time of twenty-one seconds.

Another of the four new eight-spindle machines to be displayed, the 1 1/4-inch model (Fig. 2), will produce spark plug bodies from hexagonal steel stock. This bar automatic completes sixteen operations in a cycle time of four and one-half seconds.

The 4 3/4-inch, single-spindle, fully automatic bar type turret lathe, Fig. 3, will be performing fifteen operations on a finger-holder spool with carbide tools in a cycle time of three minutes. A new cycle-timing drum provides fully automatic control of six predetermined spindle-speed changes and three selected feed ranges, as well as spindle reversing.

Other Acme-Gridley models to

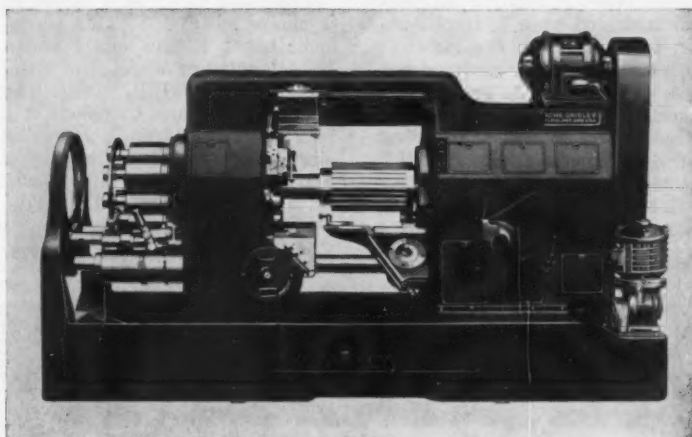


Fig. 2. Eight-spindle, 1 1/4-inch bar automatic built by National Acme Co.

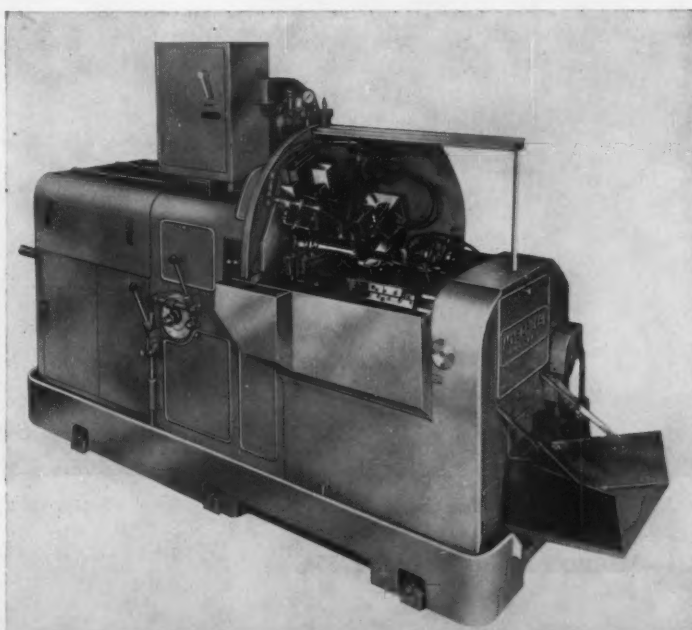


Fig. 3. A 4 3/4-inch, single-spindle fully automatic bar type turret lathe

Preview of the Chicago Shows

be demonstrated include a 1-inch, six-spindle machine with a spindle-stopping mechanism that enables a part to be cross-drilled; a 5 1/4-inch, six-spindle hydraulic chucking automatic; and an 8-inch, eight-spindle hydraulic chucking automatic arranged with double indexing to complete both ends of a cylindrical iron pulley. Also, a 12-inch, single-spindle, automatic,

chuck type turret lathe and a 12-inch Chuck-Matic single-spindle machine will be teamed up for first and second operation work, respectively, on a finger holder.

In Booth 324 the company will feature a new series of National Acme Fette self-opening, thread-rolling heads in addition to its complete line of threading tools.

Indicate Item 147 on postcard, page 325

Arter Rotary Surface Grinders

Machine Tool Show, Booth 1308

Two entirely new rotary surface grinders are to be unveiled at the Show by the Arter Grinding Machine Co., Worcester, Mass. The Model E, Fig. 1, is built in two sizes, with 12- and 16-inch chuck capacities. It is a vertical column type machine having a rectangular sliding table. A rotating magnetic chuck, driven by a hydraulic motor, is mounted on the table. By tilting the chuck, convex or concave surfaces can be ground. The wheel spindle is mounted in tapered roller bearings and driven through V-belts from a 15-H.P. motor.

Grinding is done by periphery of a 16-inch wheel. The machine can be arranged to grind work in

a completely automatic cycle, consisting of table traverse to grinding position, table reciprocation under the wheel, coarse wheel feed for rough-grinding, fine feed and spark-out period for finishing, and finally, retraction of the wheel-head and table.

The other machine, a Model F, is shown in Fig. 2. This equipment has a 12-inch chuck and a 14-inch grinding wheel. The wheel spindle has a 5-H.P. motor. The table slide operates by means of a rack and pinion from a reversing mechanism, and is driven by a 3/4-H.P. motor. Separate Reeves drives for the chuck and table deliver stepless variable speeds.

Indicate Item 148 on postcard, page 325

Armstrong-Blum to Determine Actual Sawing Costs

Machine Tool Show, Booth 416

An interesting feature at the booth of Armstrong-Blum Mfg. Co., 5700 W. Bloomingdale Ave., Chicago, Ill., will be an unbiased, fact-finding test to be conducted by an internationally known firm of test engineers. Under the complete control of the test engineers, a band-sawing machine employing high-speed steel bands, and a hacksawing machine using high-speed steel blades will be run continuously.

The work-pieces on both machines will be identical, and conditions will be fixed and rigidly controlled. In this way, the cost per piece for both band-sawing and hacksawing will be determined, and the results will be published and made available to all persons requesting them at the Show. The hacksawing and band-sawing machines to be operated during the tests will be new Marvel models, capable of the highest speed and feed practical for reasonable blade and band life.

Indicate Item 149 on postcard, page 325

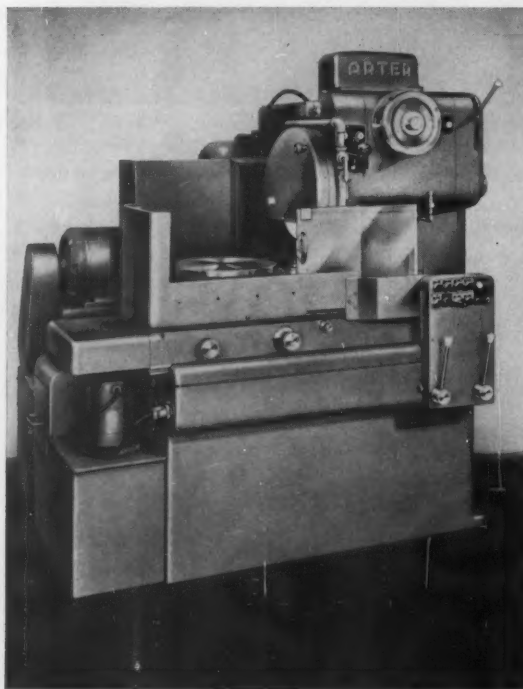


Fig. 1. Arter rotary surface grinder with 16-inch chuck

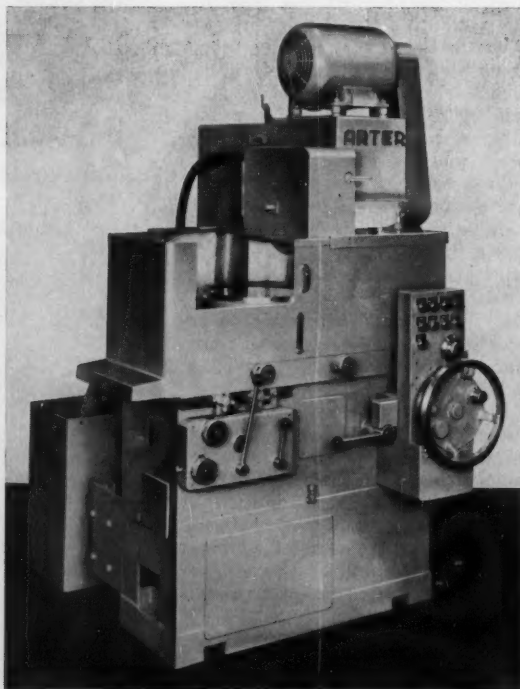


Fig. 2. Rotary surface grinder, with 12-inch chuck

Preview of the Chicago Shows

Minster Presents Four Presses with Provisions for Quick Installation

Machine Tool Show, Booth 1410

The Minster Machine Co., Minster, Ohio, will present four fully portable presses of 32-, 45-, 110-, and 150-ton capacity, respectively. Each has but one air connection and one electrical power entrance providing means for quickly placing a machine in operation.

The 110-ton, single-gear G1-110 press, Fig. 1, has a steel C-frame construction. Among its features are a long barrel type slide adjustment with exceptional gib and slide-way length, and a combination air-operated friction clutch and brake mounted on the crankshaft within the main drive gear. The cabinet legs of the machine have been designed to fully enclose the electrical, air, and recirculating lubrication systems.

Shown in Fig. 2 is a 150-ton, double-gear, twin-drive MS2-150 press. The electrical, air, and lubrication systems of this machine are enclosed within the frame of the press, and each system is easily accessible. Two-speed operation, which provides for stopping the ram at the top of a stroke at either speed with no adjust-

ment of controls, is included. Additional features are a combination air friction clutch and brake unit mounted on the intermediate shaft; a recirculating oil-lubrication system; self-oiling die cushions, and a point-of-stroke indicator. The dimensions of this press have all been worked out to comply with the J.I.C. standards.

In Fig. 3 is a 32-ton flywheel type press which has an enclosed frame top and fully boxed main bearings for greater rigidity of crankshaft and gibs. The press has an inclinable open back. The combination air friction clutch and brake is mounted with the flywheel on the crankshaft and has a protective, controlled torque feature. Electrical press controls are centrally located and have been designed to give maximum operating convenience.

A 45-ton flywheel type "Piece-Maker" press to be exhibited has a new shaper-motion feed drive which is totally enclosed and runs in oil. The length of feed can be adjusted precisely while the press is in operation. Both press and

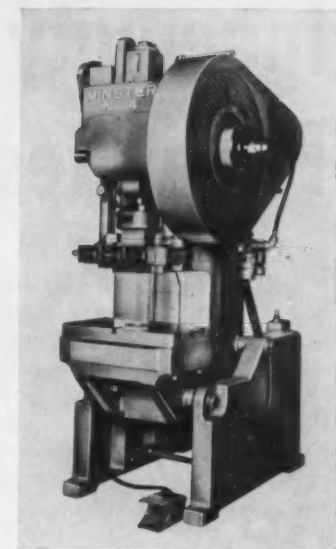


Fig. 3. Inclinable open-back 32-ton flywheel type press

feed are lubricated by a recirculating oil system which is completely within the frame of the press. All operator electrical controls are mounted in recessed openings in uprights of the press.

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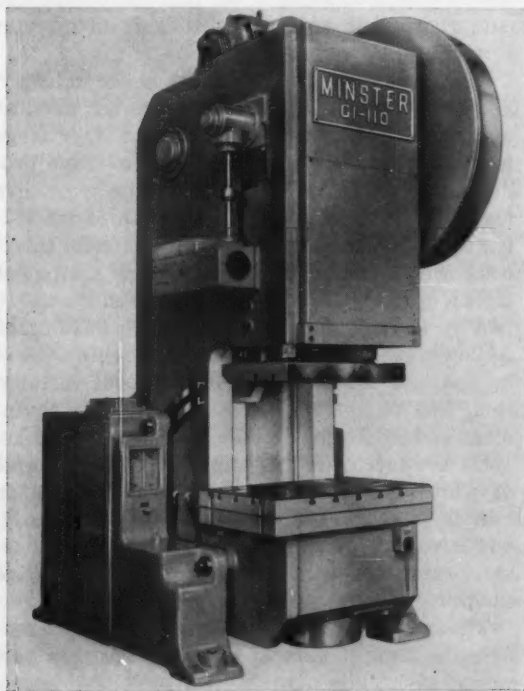


Fig. 1. Minster single-gear, 110-ton press

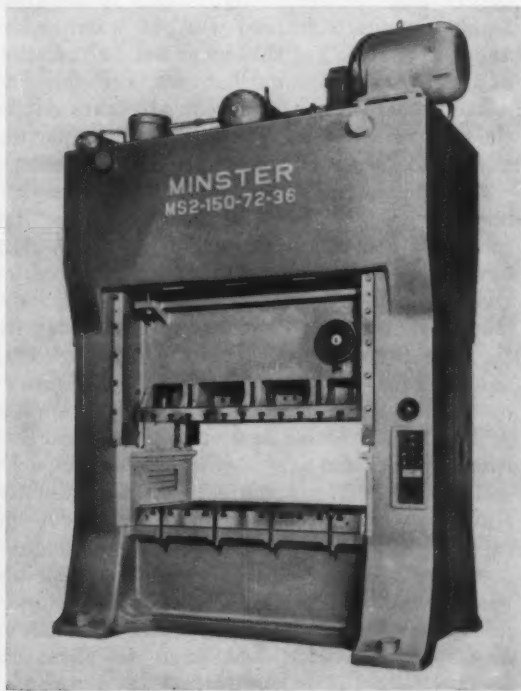


Fig. 2. Minster 150-ton, double-gear, twin-drive press

Ingenuity of Machine Builders Facilitates Aircraft Manufacture

THIS air age of near sonic and supersonic speeds, with the resulting problems of thicker integrated structures, has given our engineers plenty of opportunity to use their ingenuity. When, with the aid of slide rules, wind tunnels and analog and digital computers, they have their problems under control, the job of building the complex structures comes to the manufacturing division.

To say that this presents a challenge to production men is to put it lightly. We take it for granted that there must be complete interchangeability of all components, because otherwise the airplanes of today could not be built and serviced. And we have to interpret that interchangeability into precise tolerances on harder materials of larger sizes than ever before.

A watch is built to close tolerances in a case where there is little room for accumulated errors. A Douglas structure, however, varies from missiles to large transports with all types of fighter and bomber configurations in between. Some Douglas tolerances will put watch tolerances to shame. Yet this must not be precision at any cost. The minute that cost is relegated to a back seat, we can price our airplanes out of the picture. We must get precision by employing new techniques, new concepts, and new machines.

Precision begins with tooling—parts or assemblies are only as precise as the machines or jigs that they are made on. Machine tool builders have done a tremendous job in supplying greater rigidity, higher horsepower, faster feeds, and more exact controls. They have presented us with tools far beyond our dreams of but a few years ago. But they also present us with problems of how to use the new machines to best advantage.

We have a machine development program that receives machines new to the industry in a location isolated from manufacturing departments. Here a group of tooling experts work out the capabilities and peculiarities of new production equipment. Personnel from manufacturing departments who will later operate the machines, first observe the new equipment in the machine development division and learn all about its operation. Tooling is here planned, designed, and put into use and a record kept of procedures.

By the time that schedules for the new machine have been developed, personnel has been trained, an operating manual printed, and the machine, as an operating package, is moved into a manufacturing department ready to take up its full load. Learning headaches on the line are eliminated.

For rigging assembly jigs on which most aircraft structures grow, most of the industry has changed to optical tooling. When parts grow in size, thickness, and complexity, it becomes more important than ever for the precision that optical methods provide. Douglas, a pioneer in this type of alignment, has gone further by applying closed-circuit television in combination with optical methods.

A television camera at the telescope picks up the image reflected on the line of sight from an optical square and, on the closed circuit, enlarges the image 300 times on a mobile television screen. The jig builder at the optical square aligns it to tolerances never possible before and cuts rigging or adjustment time from minutes to seconds.

There are large new machines in the industry, and Douglas has its share, but we haven't lost our heads by buying for size alone. Our large machines must earn their way on average production runs or they would become expensive luxuries. To take care of the growth of individual components, both in size and material thickness, we have one complete line of equipment tooled up for panels measuring as much as 10 feet by 40 feet. This line begins with a Giddings & Lewis skin- and spar-milling machine. Next in line is a Knapp-Lee heat-treatment installation. The parts then move to anodizing equipment and finally to a giant Verson press brake.

On the face of it this might look like a series of white elephants. But they aren't. The spar mill is intended for prototype work primarily, but it will take production work too. When designs are established, smaller, less expensive sculpturing mills will carry production.

The heat-treatment installation will accommodate the longest part in view for the next few years by shackling two 20-foot baskets together when they are needed. The rest of the time two

By **FREDERIC W. CONANT**

**Vice-President—Manufacturing
Douglas Aircraft Co., Inc.
Santa Monica, Calif.**



20-foot baskets are used independently in regular production. The same is true of the anodizing set-up. Two independently operated parallel lines handle regular production.

The Verson press will put a 90-degree bend in 1-inch 75S-T aluminum plates 40 feet long. It has a capacity of 1800 tons. It is electronically controlled from a remote pedestal and will taper a nose skin or put in a straight contour by making hits as small as 1-inch increments. The same brake, however, is working full time on production runs of parts as small as 6 feet long.

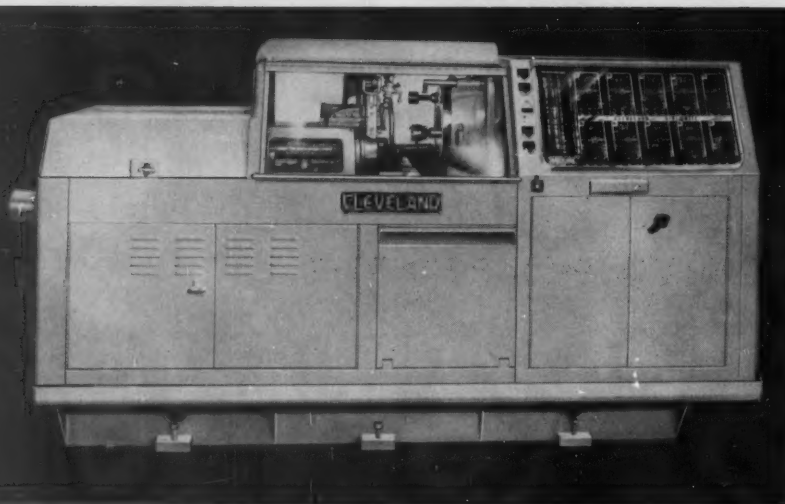
The subject of large machines cannot be left without dwelling briefly on the 308-foot Farnham spar-milling machine in one of our plants. Admittedly, no spars that long are in the foreseeable future. This mill has eight gantry carriages, each equipped with its own cutters and packaged templates. Spars can be laid end to end and a complete sequence of diverse milling operations can be done with one carriage after another passing over the spars. Eight different types of spars may be milled simultaneously. If a carriage at one end of this machine is required at

the opposite end, a crane will lift it up and leapfrog it over intermediate carriages.

Automation is carried out in one surface treatment and paint installation half a mile long where parts as small as 1 square inch or as long as 6 feet are hung on hooks from a conveyor. This overhead line dips down into five production stations in the sheet metal department for loading and then ducks down into the basement. There, in a chamber 400 feet long the parts are cleaned and chemically treated before flow-paint coating. When completed, the parts return to the first floor for drying and inspection.

The manufacture of aircraft is a challenging business. The builders of machine tools and other production equipment are of inestimable help in keeping production lines of the aircraft industry in operation on an economical basis. There is no room for obsolete equipment and, therefore, production executives of the aircraft industry will look forward with keen interest to seeing the latest types of machine tools, cutters, gaging devices, and other equipment that will be introduced at the three Chicago Shows.

Preview of the Chicago Shows



Cleveland 1 3/8-inch "Dialmatic" single-spindle automatic bar machine

Cleveland Automatic Bar Machines

Machine Tool Show, Booth 412

Three single-spindle automatic bar machines will be demonstrated by the Cleveland Automatic Machine Co., Cincinnati, Ohio. One of these machines, the 2 1/2-inch Model AW, will be shown producing a part from free-machining brass. A total of forty spindle speeds are provided, ranging from 69 to 1920 R.P.M. It is possible to perform any work within the capacity of the machine without the use of special cams.

Also to be exhibited is the single-spindle 3-inch "Dialmatic." Although this is essentially a bar machine, it can be furnished with a simple attachment that quickly converts it to a chucking machine. The machine will be shown set up with this attachment and will be performing an operation. An electric feed drive provides separate, infinitely adjustable feeds that can be pre-selected for both the forward and return motions of each of five turret positions.

The third single-spindle machine to be demonstrated is the new 1 3/8-inch Dialmatic. Like its 3-inch capacity counterpart, this machine is equipped with an electric feed drive for the infinite adjustment of feeds in either direction. No cam changes are required. Infinitely variable spindle speeds (without change gears) are provided throughout the entire range of 40 to 3200 R.P.M. Among the other features of this

machine are semiflexible spindle-bearing mounting, quick-change collet and feed-shell pads, 11 1/2-inch diameter tool turret with Geneva indexing, and universal camming. A 1 5/8-inch capacity bar machine will also be offered.

Indicate Item 151 on postcard, page 325

Kingsbury Automatic Indexing Machine and Self-Contained Units

Machine Tool Show, Booth 915

A twelve-station, twenty-eight spindle automatic indexing machine, and four improved self-contained units will be demonstrated in the booth of the Kingsbury Machine Tool Corporation, Keene, N. H. The indexing machine, Fig. 1, will be working on the four faces and the top of typical work-pieces. Twelve rotating work-fixtures make three complete turns during each cycle, thus permitting subsequent operations in a hole each time it is presented to the tools. In each revolution the main table executes a series of twelve 30-degree indexes with the work-fixtures rotating 90 degrees during each index of the main table. Operations performed include drilling, countersinking, milling, reaming, and tapping.

Two of the self-contained units are drilling heads, and two are tapping heads. All offer a cam feed through a friction clutch. Increased stroke and completely automatic lubrication are valuable new features. The drilling units (one of which is shown in Fig. 2) have an auxiliary cam lever for

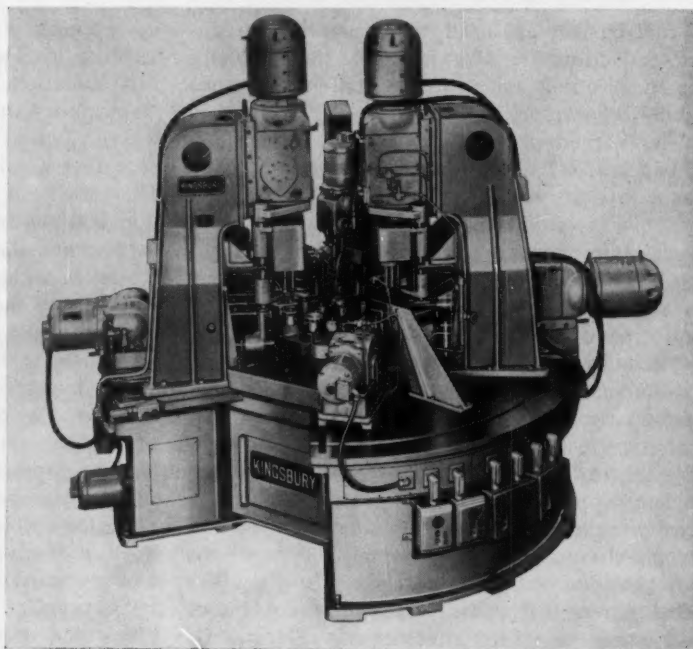


Fig. 1. Kingsbury indexing machine featuring rotating work-fixtures

Preview of the Chicago Shows

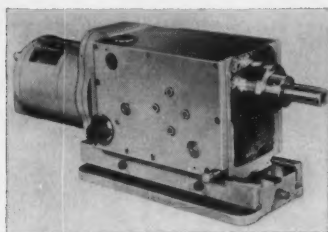


Fig. 2. Kingsbury self-contained drilling unit

operating sequence controls, such as air valves or micro switches. The tapping units are equipped with reversing motors.

Indicate Item 152 on postcard, page 325

Bliss Unveils Four New Lines of Presses

Machine Tool Show, Booth 1414

Four new lines of presses, including inclinable, straight-side, knuckle-joint, and high-production types, are being presented by the E. W. Bliss Co., Canton, Ohio. With its 75-ton, open-back, inclinable press, shown in Fig. 1, the company introduces a new series

of 75- to 200-ton machines, all equipped with a new air clutch. These presses have motorized, inclining mechanisms; a new, automatic, rotary limit switch; a return oil system; and a combination clutch and brake mounted on the crankshaft.

The frame design and box type crown add rigidity to the press and increase die life. All die spaces and electrical controls in this press line conform to J.I.C. standards. Other features incorporated include: bronze liners in the slide; extra-long gibs; and wrist type connections. Designed to receive Bliss-Marquette die cushions, the cast Meehanite frame presses are also built to take Bliss feeds and other accessories.

The 250-ton, two-point press, illustrated in Fig. 2, is one of six lines of Bliss enclosed presses designed for use in automotive and appliance industries. All wiring, piping, and controls needed to actuate the many automatic devices mounted on the press are built into the uprights. Featuring recirculating oil systems; motorized plunger and blank-holder adjustments; and high-speed air or electric clutches, the machine is

also displaying the automation switch of the company for the first time.

The switch is a mechanical rotary limiting device designed to control electrically the stopping, starting, interlocking, motion, time, sequence, and recycling of such press accessory equipment as feeders, unloaders, kickers, lifters, and dopers. It can control nine separate circuits and give independent and infinite adjustment of each circuit without stopping the press during high-speed operation.

This press is capable of speeds in excess of 450 strokes per minute. The feed mechanism includes new designs of a rack and pinion drive and an over-running feed clutch. There is also a water-cooled scrap shear.

The 400-ton, knuckle-joint press in Fig. 3 is especially built for coining, extruding, sizing, and other work needing powerful pressure close to the bottom end of the stroke. A new motorized, wedge type slide adjustment is featured, which eliminates the need for a separate top-lock device and compression springs. This suspension is self-locking at any

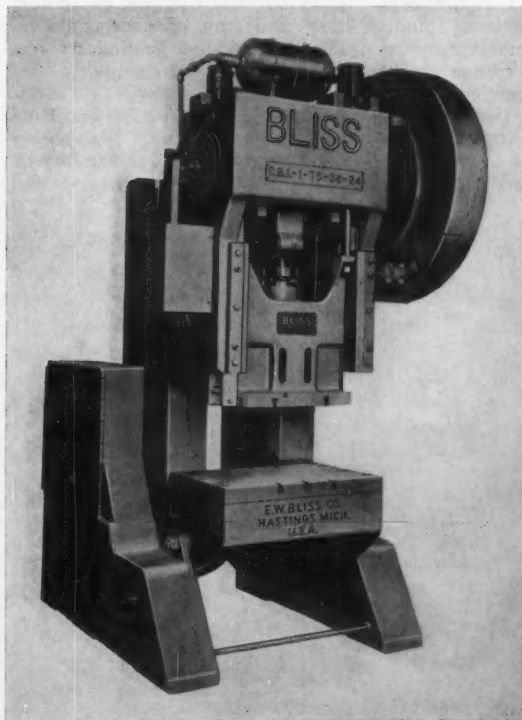


Fig. 1. Bliss open-back, inclinable 75-ton press equipped with new air clutch



Fig. 2. Straight-side, single-action, two-point press of 250-ton capacity

Preview of the Chicago Shows

point of adjustment. Air counterbalances on reciprocating parts assure smooth operation.

The press also has two independent, motor-driven lubricating systems, each interlocking against pressure failure. One system is

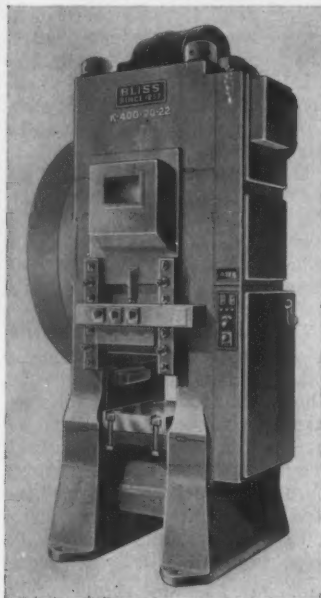


Fig. 3. Bliss knuckle-joint coin-press with wedge type slide adjustment

for circulating cascade lubrication to the knuckle-link system, and the other, for press bearings. Indicate Item 153 on postcard, page 325

Nebel Shows Its Imperial Lathe

Machine Tool Show, Booth 511

A new 20- by 40-inch, extension-bed, gap lathe, known as the "Imperial," will be exhibited for the first time by the Nebel Machine Tool Corporation, Cincinnati, Ohio. This removable-block gap lathe, shown in Fig. 1, has a swing of 24 1/2 inches over the ways and 42 inches through the gap. It is designed to be equipped with a 10- or 20-H.P. main drive motor.

With a single-speed motor, the lathe delivers eighteen spindle speeds ranging from 11 to 666 R.P.M., or 16 to 1000 R.P.M. Thirty-six spindle speeds ranging from 5 to 666 R.P.M. or 8 to 1000 R.P.M. are available if a two-speed motor is used. The direct-reading speed selector, Fig. 2, has two levers and color-keyed speed plates which are manipulated to control the range of spindle speeds. All headstock gears are shaved and hardened, and the entire gear train is automatically lubricated with an oil spray.

Shafts throughout the lathe are mounted in antifriction bearings, including the headstock spindle which runs in three bearings. The sliding upper bed is of new design and consists of a combination box girth and diagonal ribbing. Hardened and ground steel carriage ways may be added to the upper bed as extra equipment. The com-

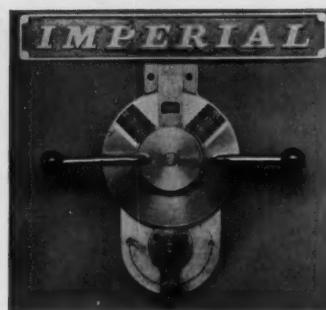


Fig. 2. Spindle-speed selector controlled by two levers and color-keyed plates

pletely enclosed quick-change gearbox provides sixty different feeds for turning and thread-cutting. Indicate Item 154 on postcard, page 325

Schauer Speed Lathes

Navy Pier, Booth 245

Automatic controls highlight the line of heavy-duty speed lathes brought out by the Schauer Mfg. Corporation, Cincinnati, Ohio. These lathes are built for twenty-four-hour operation, and offer automatic cycles of spindle start and stop, opening and closing of the work-holding fixture, and spindle speed change.

Also exhibited will be two-speed, 1-H.P. lathes for bench or pedestal mounting. Fan-cooled motors provide a high number of starts and stops per hour with-

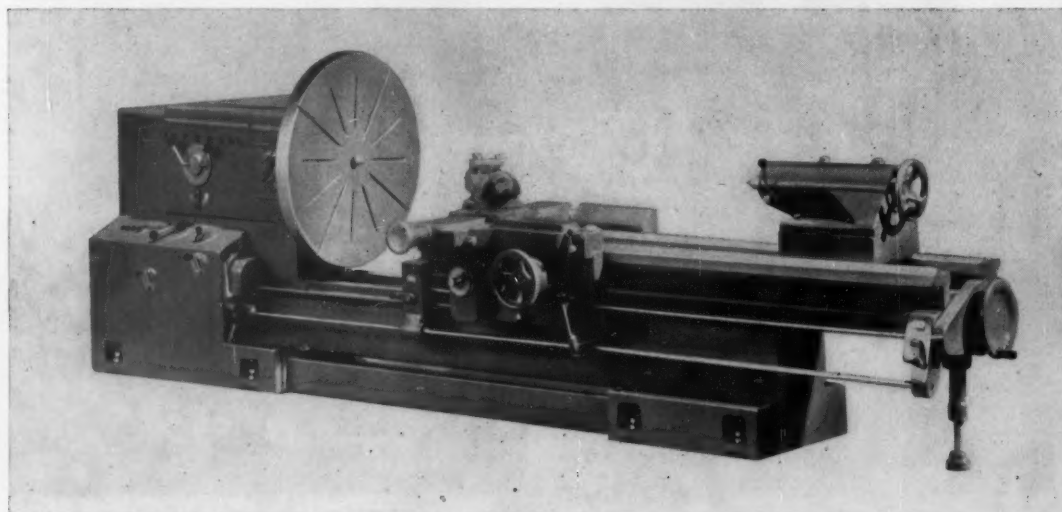
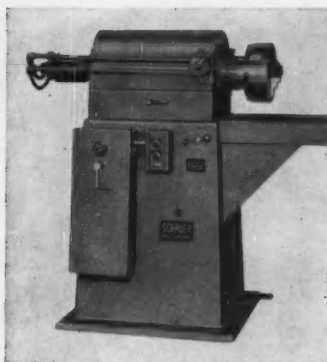


Fig. 1. Nebel extension-bed gap lathe with 24 1/2-inch swing over ways

Preview of the Chicago Shows



Schauer speed lathe for secondary operations

out overheating. A new brake design enables split-second stops to be made, even when the machine is equipped with heavy holding fixtures. Models with air-operated chucking devices contain integral double-acting cylinders of 1500-pound draw-bar capacity.

Indicate Item 155 on postcard, page 325

Bardons & Oliver Universal Turret Lathe

Machine Tool Show, Booth 325

Among the machines to be exhibited by Bardons & Oliver, Inc., Cleveland, Ohio, will be a No. 4 universal turret lathe. Headstock controls, as well as those for certain other machine functions, have been regrouped to decrease the physical effort required of the operator. Sixteen spindle speeds are available in a wide range to handle a large variety of work.

A slight motion of one handle

automatically controls the electric clutches, as well as the speed changing. Speeds are pre-selected, and correct cutting speeds determined, by a large dial. Three speed ranges and higher horsepower motors are available.

Twelve feed changes are provided to the turret-slide and carriage, and the feeds are indicated on large, easily read dials. Feed changes in each apron are made with a single lever. Heavier cuts can be taken because of the positive feed clutches.

A hydraulic collet chuck and bar feed features fast operation, strong gripping and ease of control. After a length of bar stock is inserted, no further handling is required until another length is needed.

Another machine being shown is a No. 21 saddle type turret-lathe featuring higher spindle speeds and horsepower. Additional turret lathes to be displayed include a No. 7 universal turret lathe with 4 1/2-inch bar capacity, a No. 3 universal turret lathe providing higher spindle speeds, and a No. 1 geared, electric turret lathe having automatic cycling. Two sizes of Bardons & Oliver cutting-off lathes will also be exhibited.

Indicate Item 156 on postcard, page 325

Ettco-Emrick Drilling and Tapping Equipment

Navy Pier, Booth 527

Several new developments in the field of drilling and tapping will be featured by Ettco Tool Co., Inc., Brooklyn, N. Y. One of these

developments is the A.T.U. No. 3 lead-screw tapping unit, Fig. 1. This electrically operated, self-contained device can be used for either single- or multiple-spindle precision tapping. Featured in the unit are two instant-acting electromagnetic clutches that provide forward and reverse motion. This



Fig. 2. Ettco-Emrick lead-screw tapping machine which features both forward and reverse electromagnetic clutches

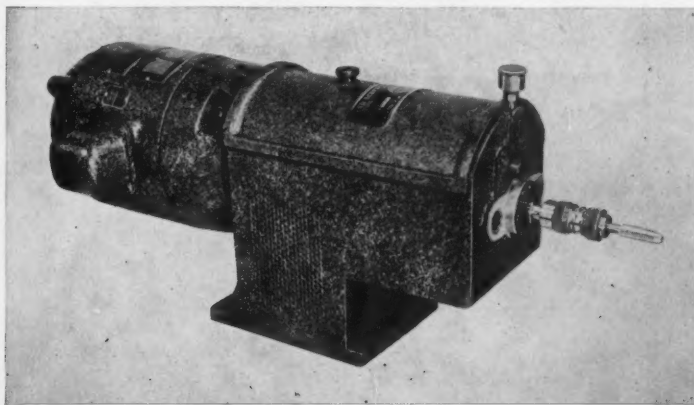


Fig. 1. Lead-screw tapping unit will be exhibited by Ettco Tool Co., Inc.

movement is controlled by a built-in rheostat that serves to regulate clutch torque. Both the lead-screw and the mating bronze split nut are interchangeable to establish the required pitch.

Electromagnetic forward and reverse clutches, with a built-in rheostat to permit the regulation of available torque from 0 up to the equivalent of 2 H.P., are also features of the A.T.U. No. 3 lead-screw tapping machine, Fig. 2. Tapping depth may be controlled within one-quarter turn of the tap. The machine is available with a wide choice of direct-mounted motor drives as well as single- or multiple-pulley drives.

Two new flex-shaft multiple-spindle drilling and tapping heads, Model 600 (two to six spindles),

Preview of the Chicago Shows

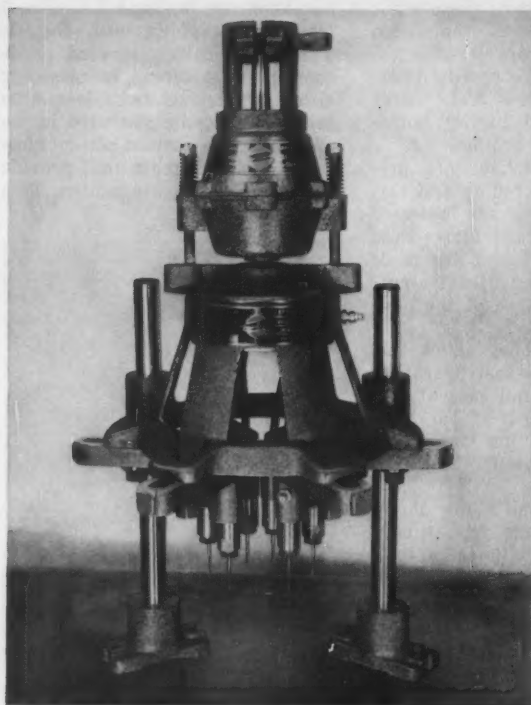


Fig. 3. Circle type flex-shaft multiple-spindle drilling and tapping head

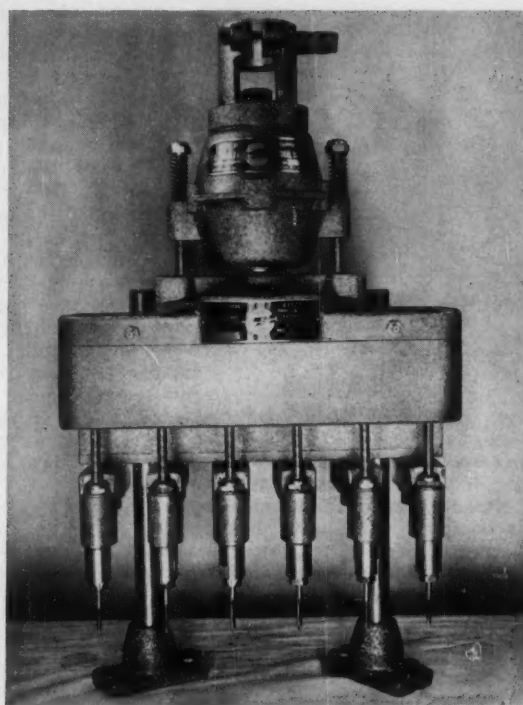


Fig. 4. Ettco-Emrick straight-line flex-shaft multiple drilling and tapping head

Fig. 3, and Model 800 (two to eight spindles) offer a wide range of spindle settings. Spindle adjusting arms can be moved in and out, or in a transverse direction, while the unit is operating. Capacities range up to 5/16 inch for drills and taps. Minimum and maximum bolt-circle diameters for the Model 600 are 1 7/8 inches and 6 7/8 inches, respectively. The minimum and maximum bolt-circle diameters for the Model 800 are 2 7/8 inches and 8 13/16 inches, respectively.

Up to six holes can be drilled anywhere within a rectangular area measuring 3 by 13 15/16 inches with the Model 1000 straight-line, flex-shaft multiple-spindle head. Designed to fit any drill press or tapping machine, this unit, Fig. 4, will handle any hole pattern—circular, rectangular or in a straight line.

Other equipment to be exhibited will include fixed-spindle and geared adjustable-spindle multiple heads, high-speed sensitive tapping attachments, automatic and semi-automatic single and multiple tapping machines, electric indexing fixtures, tap and drill chucks.

Indicate Item 157 on postcard, page 325

Precision Grinders Introduced by Besly-Welles

Machine Tool Show, Booth 911

The Besly-Welles Corporation, Beloit, Wis., is exhibiting for the first time a Model 240 horizontal

double-spindle grinder, Fig. 1, developed for greater precision at higher production rates. A feature

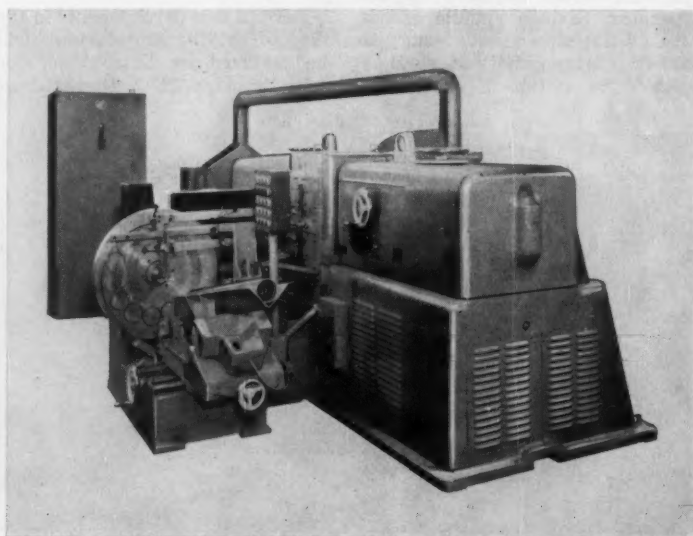


Fig. 1. Besly horizontal double-spindle grinder

Preview of the Chicago Shows

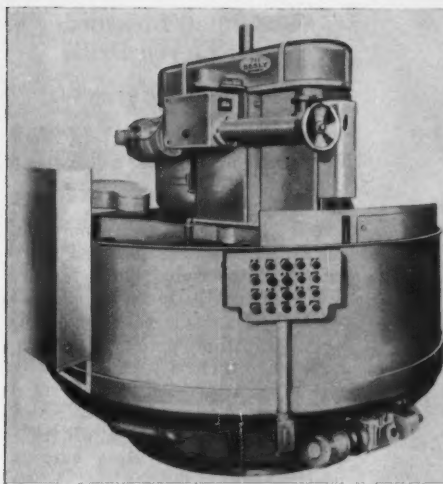


Fig. 2. Besly-Bowen radial-head face grinder

of the machine is an electromagnetic feeder unit that delivers work between the discs in a steady stream. Control of the No. 240 is entirely automatic—even dressing of the discs is directed from a push-button. An improved quill design seals out grit, and permits smoother and more accurate adjustment of the discs.

Also on display will be a Model 711 Besly-Bowen radial-head face grinder, shown in Fig. 2. This machine permits continuous production with an automatically controlled grinding cycle at one rotary work-table while loading is

in progress at a second table. A third new machine is illustrated in Fig. 3. This is a Model 910 grinder, that completes two surfaces parallel in one pass between twin abrasive discs.

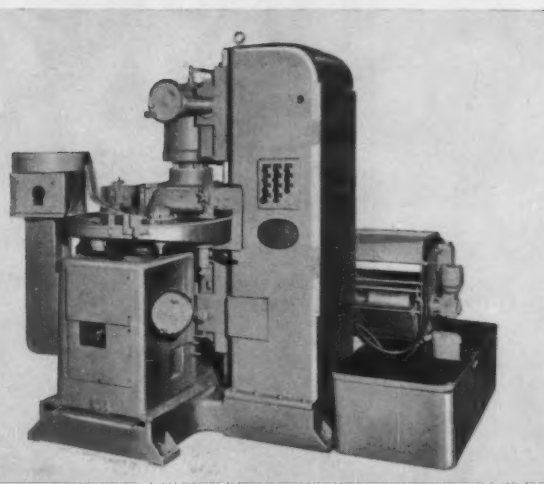


Fig. 3. Double-disc grinder for parallel surfaces

Other equipment at the company's booth will include its Model 318 tub grinder, and line of high-speed cutting tools and abrasive discs and wheels.

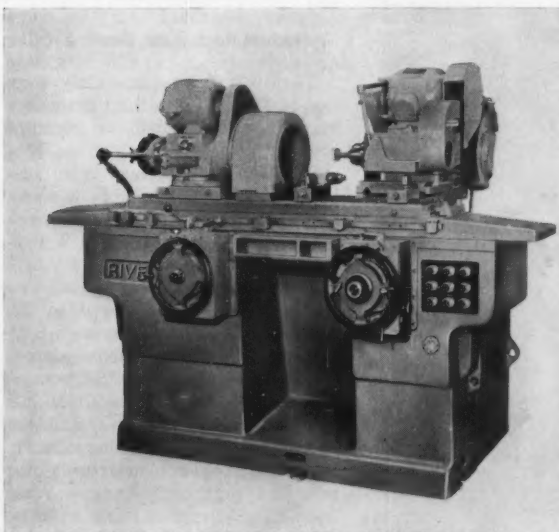
Indicate Item 158 on postcard, page 325

Rivett Grinding Machine and Turret Lathe

Machine Tool Show, Booth 805

A combination internal and universal grinding machine, and also an improved cabinet turret lathe, will be exhibited by Rivett Lathe & Grinder, Inc., Brighton, Bos-

ton, Mass. Set-up time is reduced on the Model 1024 internal and universal grinding machine by means of a double-end wheel-head that swivels through an arc

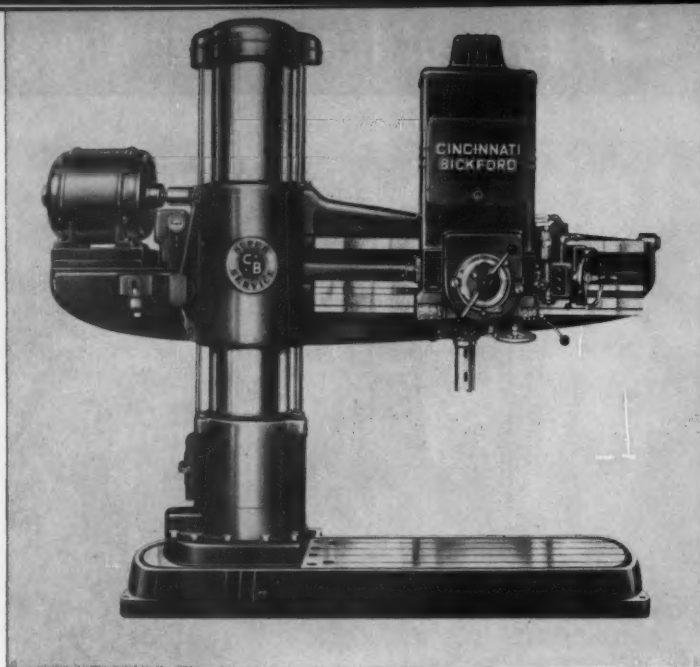


Rivett internal and universal grinding machine (left) features a double-end wheel-head. Single lever controls spindle brake, spindle drive, and collet release on improved cabinet turret lathe (right)

Show Previews

Cincinnati Bickford Shows Eleven Drills

Machine Tool Show, Booth 901



Cincinnati Bickford radial drill with hydraulic, speed-range pre-selector

of 180 degrees for quick conversion to internal or external work. Holes may be ground to an accuracy of plus 0.0003 inch, minus 0.0000 inch. The machine will handle inside diameters up to 9 inches, and outside diameters up to 12 inches.

Model 918 ST improved "Steelway" cabinet turret lathe features a production drive with instant starting and stopping of the spindle. A single-motion control closes the collet on the work, re-

leases the brake, and engages the spindle. When the lever is pushed back, the spindle drive is disengaged, the brake applied, and the work released. The drive motor runs continuously during loading and unloading of the machine.

Other machine tools to be exhibited in this booth are a precision tool-room lathe, a cabinet lathe, a small internal-external grinding machine, and an armature-turning lathe.

Indicate Item 159 on postcard, page 325

The Cincinnati Bickford Tool Co., Cincinnati, Ohio, will exhibit eleven Super Service machines, consisting of five radial drills, five upright drills, and a portable horizontal drill. Illustrated here is one of the radial drills featuring a hydraulic speed-range pre-selector. Four ranges are available and there are nine speeds in each which are obtained by means of a lever. Eighteen rates of power feed can be obtained through a balanced gear-shifting mechanism incorporating various positive-gear tap leads.

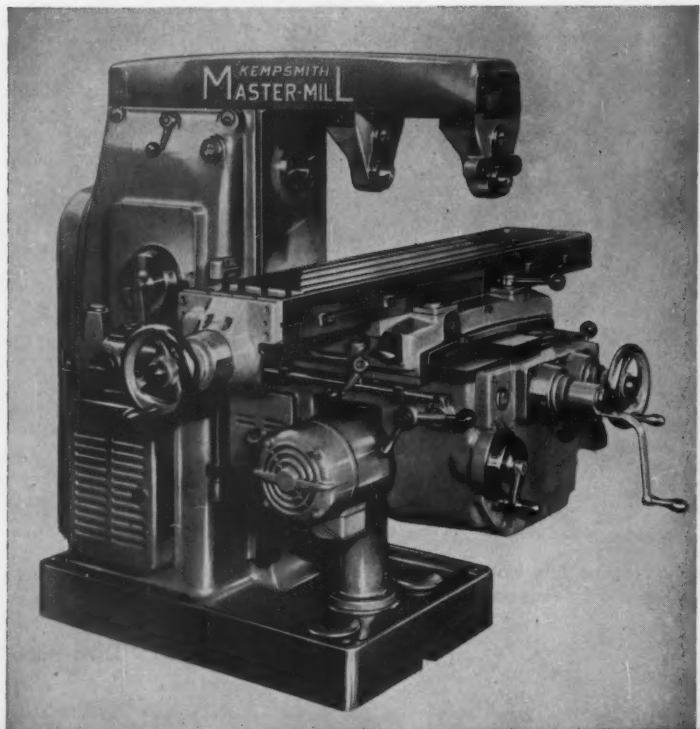
A safety mechanism protects the head from damage at the end of its travel. While the head is being traversed, the controlling handwheel does not revolve. The drill arm is elevated through a simple push-button control.

Another new radial drill features a complete pre-selection of speeds and feeds by two conveniently located dials. Speed and feed change levers have been eliminated. Pre-selection of any speed or feed is possible with the spindle rotating. Standard equipment includes a direct-reading device for programming.

Indicate Item 160 on postcard, page 325

Kempsmith Knee Type Master-Mill

Machine Tool Show, Booth 616



The first of a completely new line of knee type milling machines here illustrated, will be demonstrated by the Kempsmith Machine Co., Milwaukee, Wis. Initially, the Nos. 2 and 3 sizes, both in plain and universal models, are being built with 7 1/2 to 10-H.P. spindle-drive and 1 1/2 to 2-H.P. feed-drive motors.

The spindle is powered by its motor through a gear train which actuates eighteen speed changes over a 25- to 1500-R.P.M. range. An electrical spindle control has eliminated all couplings, friction clutches, and other power-absorbing devices. The feed-drive motor provides eighteen changes from 3/8 to 45 inches per minute.

Kempsmith Master-Mill with separate feed-drive and spindle-drive motors

Show Previews

High-speed power traverse in all directions is possible.

Push-buttons located on the front of the knee and on the side of the column start and stop the machine. Power-feed controls are grouped on the front of the knee.

Also included in the design are an over-sized lead-screw that eliminates elasticity in the drive; saddle ways that are fully covered by the table even at full travel; and large bronze lead-screw nuts of the locking type that are directly adjustable from the front of the saddle. These nuts supply effective backlash control for climb-milling.

Indicate Item 161 on postcard, page 325

Hanson-Whitney Introduces Hydraulic Thread-Milling Machine

Machine Tool Show, Booth 807

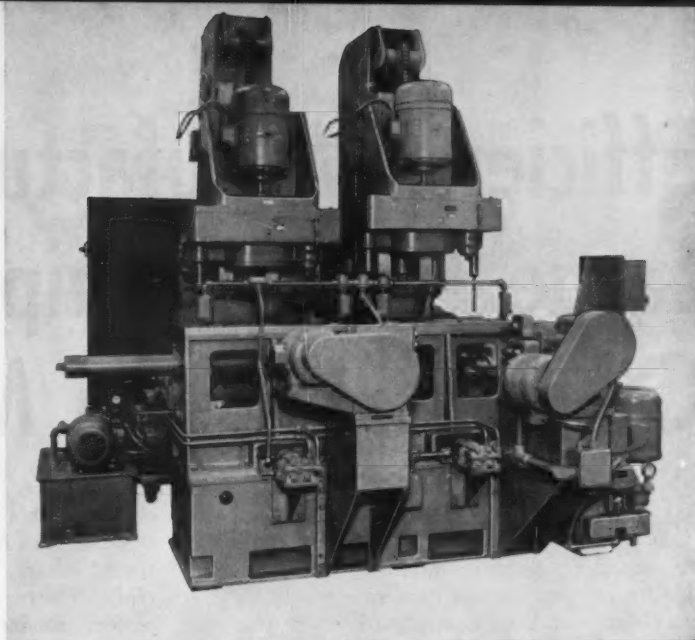
A new 4- by 9-inch hydraulic semi-automatic thread-milling machine will be introduced by the Hanson-Whitney Co., Division of Whitney Chain Co., Hartford, Conn. The machine, shown in the illustration, has pump and hydraulic motors for actuating the work-head and the cutter-head.

The hydraulic feature permits balancing cutter speed and work speed, thus producing optimum cutting conditions. Spindle speeds are infinitely variable within normal cutting range to facilitate machining of unusual alloys. The standard machine is available with internal or external cutter-head and will produce internal or external, straight or tapered threads up to 4 inches in diameter, and 9 inches from the collet.

The company's interchangeable lead cams and cross-feed cams have been retained in the new machine. A quick-acting hydraulic closing mechanism has a hole through its center to accommodate long shafts. Other design features are a work-head spindle collet capacity of 2 inches; a cutter spindle with tapered roller bearings which permit heavy cuts at high speeds, and a cutter-head tachometer which indicates speed, and warns of cutter dullness by reduction in the revolutions-per-minute reading.

Indicate Item 162 on postcard, page 325

Hanson-Whitney hydraulic, semi-automatic thread-milling machine



Baker Brothers, Inc., will show a new three-unit transfer machine which is patterned after this two-unit model

Baker Displays New Three-Unit Transfer Machine

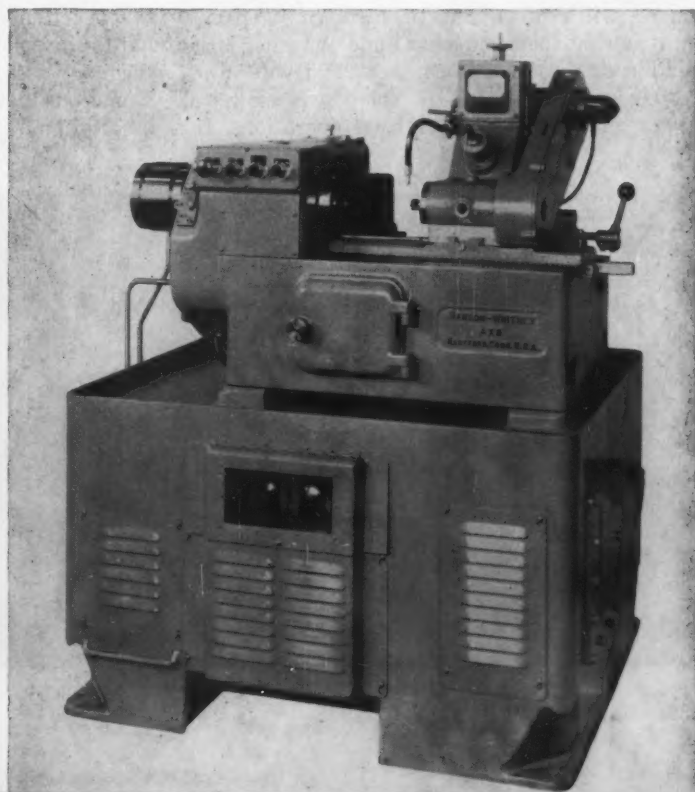
Machine Tool Show, Booth 1421

The main display of Baker Brothers, Inc., Toledo, Ohio, will be a three-unit transfer machine patterned after a smaller two-unit machine here illustrated, but containing, in addition, a number

of new developments in tooling.

The new machine consists of units designed for combination boring and counterboring at one station, cross-feed facing at an-

(Continued on page 238)



Efficient Manufacture of Large Power Equipment Calls for Modern Machines

AT perhaps no other time in the history of the production of large electrical power and industrial equipment has the necessity for efficient tooling been so essential as it is in this day of keen competition. Over the long pull one of the factors by which we can judge ourselves as capable business executives is the extent to which we keep our house in order and continually try to move ahead in the businesses in which we are engaged.

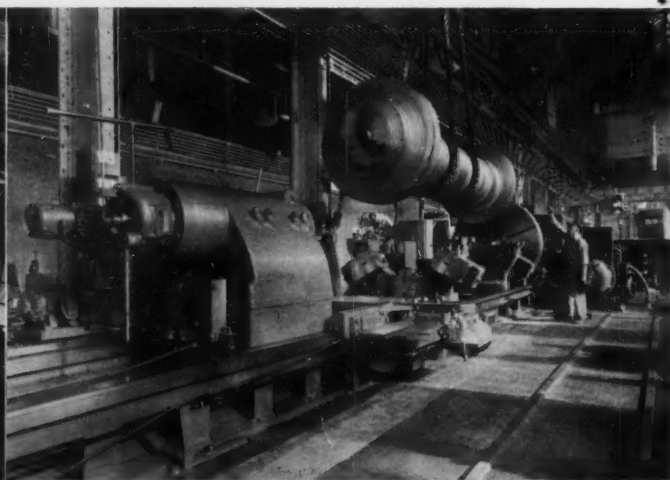
At Allis-Chalmers we have given full attention to this phase. In the last five years we have invested over \$70,000,000 in capital expenditures for plants and equipment, and in the same five year period over \$74,000,000 has been spent for small tools, dies, jigs, fixtures, maintenance, and repairs which were charged to current operations. Thus, over \$144,000,000 has been reinvested in the business in five years.

Our plans for the future, short range and longer, will require investment of capital funds in somewhat the same magnitude. A rather large portion of these funds has been and will be invested in facilities for the company's electrical power and industrial equipment operations. In-

cluded in this work, of course, are the machine tool facilities for the manufacture of large power transformers, circuit breakers, distribution transformers, steam turbines, turbo-generators, motors, condensers, hydraulic turbines, blowers, kilns, coolers and crushers. All of this is based on the prediction that the use of electrical power will double during the next decade.

Because we are engineers and manufacturers of a wide selection of large industrial products and of smaller motors, pumps, V-belt drives and controls, our association with machine tool builders has been a continuous function. Many of our machines and tools are special for our products. It is the first time some of them have been made. Keeping up-to-date on the so-called standard general-purpose machine tool is also, of course, a continuous function.

We find that the association with the engineers in the machine tool industry not only assist us in the selection and design of new machine tools, but they also of necessity must keep up-to-date in the many uses which their products can perform. Numerous new ideas are generated from this association.



By J. D. GREENSWARD, Vice-President
Director of Manufacturing
Industries Group
Allis-Chalmers Mfg. Co.



Our problem is accentuated because of the extreme versatility of our products. As an example, a 90-inch by 84-inch by 56-foot milling machine, capable of milling a coil slot 2 inches wide and approximately 10 inches deep for a turbo-generator rotor, must be quickly converted into a general-purpose four-head vertical milling machine. Many of our vertical boring mills are equipped with side-heads and milling attachments to provide this same versatility. Other typical tools used in the manufacture of our variety of products include 30-foot and 40-foot vertical boring mills, shears for handling 1-inch thick by 16-foot long steel plates, hydraulically operated press brakes for 1-inch by 16-foot plate, a 400-ton gantry type, single-ram hydraulic straightening press, and a pit type welding machine capable of positioning the largest and bulkiest parts in the most practical manner.

Not only must we be able to handle huge pieces, but also to machine within tolerances of 0.0005 inch or less on shafts, rotors, turbine spindles, and other parts on 72-inch, 96-inch and 144-inch lathes. The finishes, of course, must meet exacting standards along with the tolerances. Special machines mill steam turbine blades up to 50 inches long, within exacting tolerances.

Semi-automatic and automatic electronic controls are being increasingly employed in the latest machine tools. The milling machine referred to has a power-operated indexing mechanism actuated by an electric eye. A 144-inch engine lathe for machining rotors that measures 60 feet between centers and is capable of handling a 200-ton forging, has its major movements electronically controlled.

Deeply cognizant of the need for keeping its production facilities and manufacturing costs in step with the times, Allis-Chalmers periodically reviews its machine tools and groups them according to priority replacement necessity. However, replacement may be expedited by excessive maintenance costs, by the availability of more efficient machines that provide cost reduction possibilities, and by obsolescence due to product design changes. Close watch of production facilities has been helpful in reducing the factory cost ratio.

It is our good fortune that machine tool builders have progressed in the last decade to keep up with our requirements. The progress in cutting tools and the increased feeds and speeds present a challenge to both the users and builders of machine tools.

Preview of the Chicago Shows

other, and multiple drilling at a third station.

It is believed that the display will prove the feasibility of transfer equipment for semihigh production and versatile manufacturing requirements. All units of the transfer machine will be generally heavier and of greater capacity than similar units of the past.

They will also have the added advantage of controls and hydraulics more easily accessible for maintenance.

The Model 25 Keyseater and the Model KFY sensitive drilling machine for single- or multiple-spindle operations will also be shown by the company.

Indicate Item 163 on postcard, page 325

Van Norman Automatic-Cycle Plunge-Cut Grinding Machine

Machine Tool Show, Booth No. 905

Two plunge-cut grinding machines, designed on the Bowgate principle, will be among the new equipment to be featured by the Van Norman Co., Springfield, Mass. One of these machines will be of the double-head type set up for grinding pump pinions that are integral with a shaft which projects from both sides of the pinion. In this operation the sides of the pinion, which is approximately 2 1/2 inches in diameter, must have a finish between 4 and 5 micro-inches. Three bearings on the shaft will be simultaneously ground to diameters of 5/8 or 7/8 inch within 0.0001 inch. Adjacent to the pinion, two of the bearing surfaces will be under-cut simultaneously with the grinding of the bearing surfaces and the pinion sides, to form recesses.

Bowgate wheel-head units are specifically intended for the production grinding of parts having a number of cylindrical surfaces and faces or shoulders to be finished by grinding. When the cycle button is depressed, each wheel-head unit goes through the following movements: (1) a rapid traverse to the work; (2) a controlled diminishing feed movement; (3) an adjustable time delay for spark-out; and (4) a rapid return to the starting position. Either or both heads can be operated at the same time.

One of these double-head machines is illustrated in Fig. 1. The machine at the Show will be similar in appearance but will not be equipped with the compensating units seen on the machine illustrated. There will, however, be a

single-head machine provided with the compensating unit.

The wheel-heads are angularly positioned to facilitate the grinding of shoulders, advancing to the work at an angle of 14 degrees. The heads can be equipped with wheels as large as 10 inches in face width by 30 inches in diameter, and have 20-inch mounting holes. A 15-H.P. motor, running at 1800 R.P.M. drives each head through five V-belts. Wheels may be used that are solid in width, or a series of narrow wheels may be employed, spaced to suit needs.

During the rapid traverse each wheel-head and its slide moves as one unit on the sub-base to within 0.001 inch of the work. Then, a hydraulic valve is actuated to permit the wheel-head to move forward a slight amount to finish the work. This movement of the wheel-head is independent of its slide, which remains stationary. The movement of the head is obtained by means of a vertical piston which flattens a bowed flat spring. When the spring has straightened out, spark-out takes place, after which the head returns to its starting position. The maximum movement that can be imparted to the wheel-head by the bowed spring is 1/16 inch, which enables cylindrical surfaces to be reduced as much as 1/8 inch in diameter. A cam controls the position to which the head can return after a part has been ground to finished size.

A metering valve in the hydraulic system controls the speed of the feed, so that it can be made fast for rough grinding or slow for finishing. The wheel-heads can be adjusted laterally as well as in and out.

These plunge-cut grinding machines are equipped with Hoglund automatic contour dressers, as illustrated in Fig. 2. One of the outstanding features of these dressers is that they can true wheels at any angle as well as perpendicular to the wheel spindle for the accurate grinding of faces and shoulders of workpieces. Each dresser is actuated by a hydraulic cylinder controlled by a four-way solenoid valve and metering valves.

The diamond holder of each dresser unit is connected to a main slide that carries a contour cam and a wedge-shaped feed cam. This template slide is operated

Fig. 1. Van Norman Bowgate automatic-cycle plunge-cut grinding machine similar to a machine that will grind pump pinions at the Machine Tool Show



Preview of the Chicago Shows

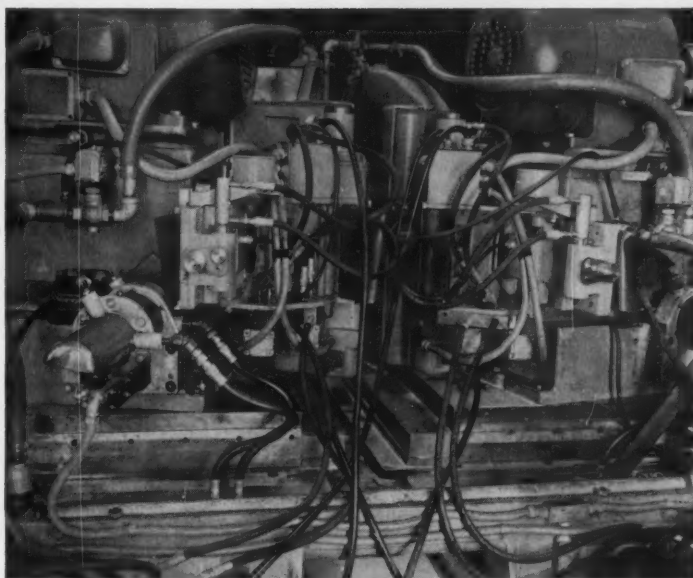


Fig. 2. Hoglund contour dressers keep the 30-inch grinding wheels of the machine in Fig. 1 properly dressed for taking a multiple number of cuts simultaneously on the work-piece

required movement across the wheel up to 6 1/8 inches. Through an arrangement of auxiliary slides and followers, the contour cam moves the diamond slide in and out with respect to the face of the grinding wheel at the same time that it is fed across the wheel under the control of the wedge-shaped cam. Flat surfaces on the wedge-shaped cam provide for stopping the lateral movement of the diamond at points where the wheel is dressed vertically to suit the grinding of shoulders or faces. Any desired combination of dresser movements can be obtained by proper design of the cams. The dressers can be arranged to operate automatically, after any prescribed number of pieces have been ground, or manually at periods determined by the machine operator.

The single-spindle automatic-cycle plunge-cut grinding machine to be exhibited at the Show will be provided with an inspection panel similar to that shown in Fig. 3, except that whereas the illustrated panel is provided with three Lectrolair gaging units for checking the dimensions of three surfaces, the panel at the Show will have only one of these gaging units. When the work-piece is placed in the fixture at the front of this panel, as illustrated, separate lights at the top of the pan-

el will go on if the part is over size or under size. The panel will be connected electrically to a compensating unit on the machine which will advance the wheel head unit with respect to its starting position in accordance with a pre-

set amount to correct for error in the work, or stop the machine from cycling if the piece is under size. If the work-piece is within the specified tolerance, it will be automatically ejected from the gaging fixture.

Indicate Item 164 on postcard, page 325

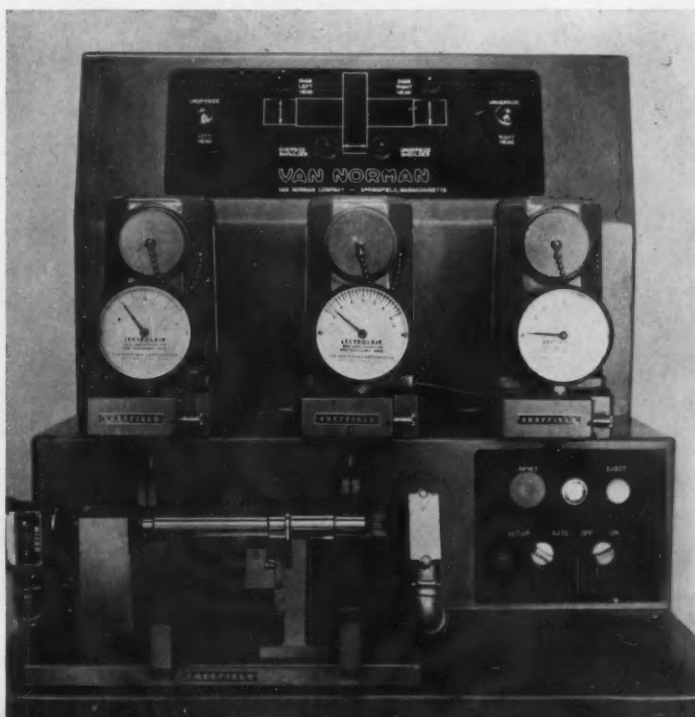
Shell Voluta Oil 23

Navy Pier, Booth 154

A quenching oil, claimed to give fast cooling rates in conventional quenching set-ups, has been announced by the Shell Oil Co., New York City. Known as Voluta Oil 23, it has high oxidation stability and causes little smoke and flame during normal hardening operations. The cooling rate of the oil is sufficiently high initially to avoid unwanted transformation products, yet slow enough in the final stages to control the dangers of warping, cracking, or distorting. Other important advantages claimed for this product are its high water tolerance, low volatility, and low drag-out losses. Furthermore, the oil is generally compatible with heat-treating salts. The flash point of this oil is 380 degrees F. and the fire point is 425 degrees F.

Indicate Item 165 on postcard, page 325

Fig. 3. Gaging panel which controls compensating device of wheel-head on Van Norman plunge-cut grinding machine



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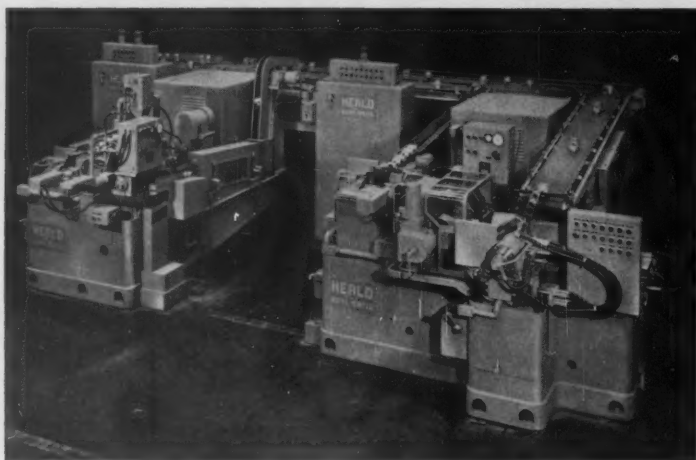


Fig. 1. Segment of fully automated piston production line built around two Heald Bore-Matics

Heald Boring and Grinding Equipment

Machine Tool Show, Booth 902

For the purpose of demonstrating the adaptability of the new Model S Bore-Matics to fully automated, continuous-flow production line set-ups, a sample segment of such a piston line, Fig. 1, will be shown for the first time by the Heald Machine Co., Worcester, Mass. The set-up consists of two

individual machines placed side by side and connected by a conveyor belt. Pistons enter a loading chute from the conveyor and are delivered to the first machine where they are clamped into place and have the wrist-pin hole bored. The work is transferred to an air-gaging station for sorting. Over-

size or under-size work causes an indicator light to flash and then the machine stops.

From the gaging station, acceptable parts roll down to a flushing station, from which they are transferred to the second machine. Here the pistons undergo an elliptical box-turning operation. Following this, the work is again air-gaged for size, with unacceptable parts stopping the machine.

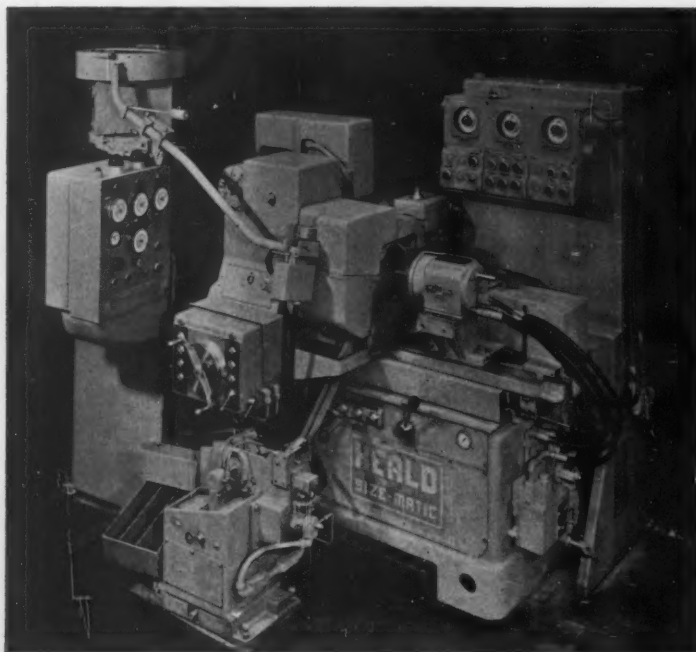
Three new and completely automatic high-production internal grinding machines will be displayed. They are the Model 170 automatic-chucking internal grinding machine, Fig. 2; the Model 190 "Centri-Matic" bore-grinding machine; and the Model 1901 Centri-Matic ball-track internal grinding machine. All three machines employ self-adjusting grinding cycles through a feed-back system. Wheel changing at periodic intervals is the only attention the machines require, and for which they shut down automatically and signal with flashing lights.

The Model 170 is an end-loading, automatic chucking machine employing feed-back to a "Size-Matic" cycle. Hopper feed with automatic part orientation is used. The Model 190 is particularly well suited to handling inner races for anti-friction bearings. Parts are located on the ball track against hard shoes. Rotation is by frictional engagement with a rotating backing plate. Other new features include air gaging, sorting, and feed-back. Should a predetermined number of parts run outside of the tolerances, the machine shuts down. The Model 1901 is designed for production finishing ball tracks on outer races.

A new, precision tool sharpening machine, Fig. 3, will be introduced. Direct-reading scales permit easy setting of the various angles and the tool-point radius. The tool-holder swings through an included angle of 150 degrees. Trouble-free operation is assured by having the gear-box completely enclosed in an oil-tight case. A free-hand grinding attachment can be used with the machine to handle large, flat, or odd-shaped tools.

Two completely new horizontal cam-actuated Bore-Matics and a redesigned vertical cam-actuated Bore-Matic will also be shown for the first time. The horizontal machines, Models 2215 and 3215

Fig. 2. Heald automatic-chucking internal grinding machine



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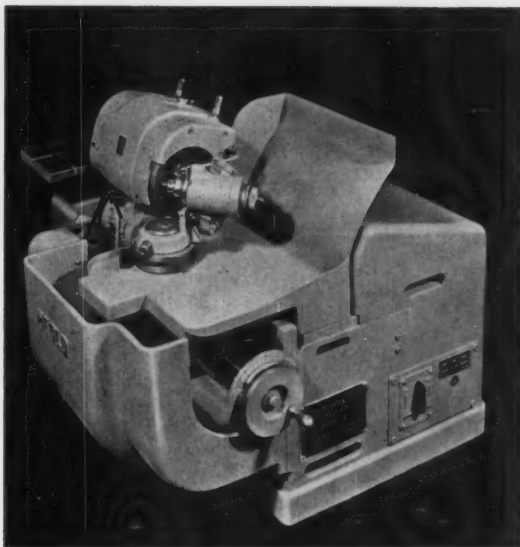


Fig. 3. Precision tool-sharpening machine to be displayed for the first time by Heald Machine Co.



Fig. 4. Cam-actuated Bore-Matic primarily intended for the high production of a single part

(the latter shown in Fig. 4) are identical in basic construction except for size and capacity. They are constructed with a rigid base and hardened box type ways that are under continuous pressure lubrication. A hydraulic gib not only maintains accurate alignment but also functions as an automatic take-up for any wear that might occur.

When cycling, the table is ad-

vanced to the cam by air pressure, at which point the cam takes over for the actual boring. Any combination of contour boring, turning, facing, or grooving operations can be performed. Rapid traverse stroke length is 10 inches on Model 2215, and 13 inches on Model 3215. Boring stroke is 4 inches; cross-slide stroke, 3 inches.

A newcomer to the company's line of precision finishing ma-

chines is the Model S vertical Bore-Matic, Fig. 5. This machine represents but one of a variety of vertical arrangements which provide a means for accommodating work which is more readily loaded and machined in a horizontal plane. The vertical and horizontal slides ride on box type ways having force-feed lubrication. Vertical or angular, as well as horizontal slide-units are possible because

Fig. 5. Hydraulically powered vertical machine has been added to the company's line of Bore-Matics

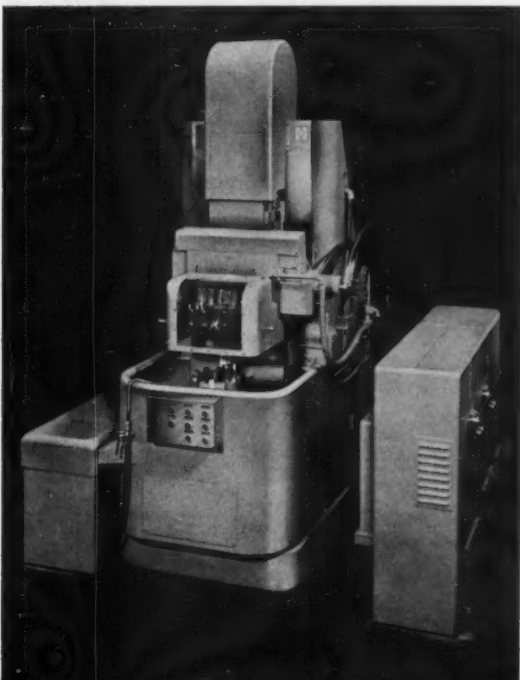
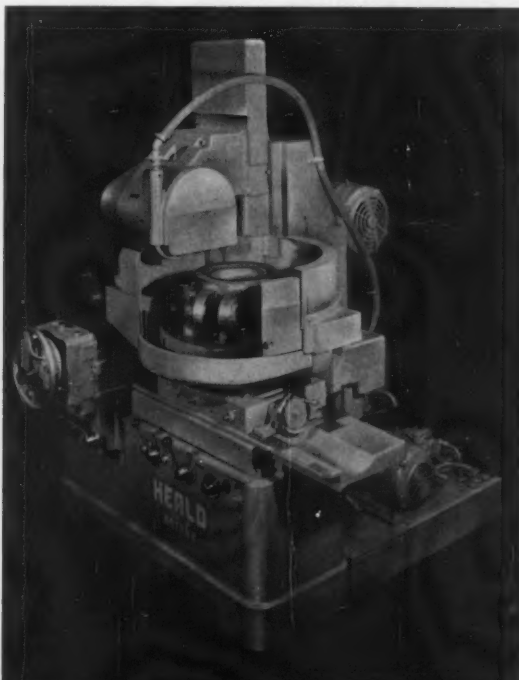


Fig. 6. Vertical-column, rotary surface-grinding machine is available either plain or with automatic cycling



Preview of the Chicago Shows

the table is gibbed to the under side of the hardened ways. Compact hydraulic power units are separate from the machine base, thus reducing the problem of isolating heat and vibration.

Two new models of vertical-column, rotary surface-grinding machines—Model 161 having a 6-inch chuck, and Model 361, Fig. 6, having a 24-inch chuck—will also be exhibited for the first time. The smaller model has a power-driven reciprocating table and is especially suited to small surface-grinding work. The large model is similar in construction but has the rigidity and power necessary for heavy stock removal. A double-pump system on this hydraulic model assures little heat generation. The machine is furnished either plain or with automatic cycling, both types being equipped with power vertical feed and traverse for the wheel-slide in addition to hydraulic table drive. An attachment for automatic spark-control is available.

Indicate Item 166 on postcard, page 325

Programmer for Automatic Operation

Navy Pier, Booth 427

A tape-fed programming device that permits automatic machine tool operation, except for loading and unloading, is announced by the Hillyer Instrument Co., New York City. At the Show, the programmer will be applied to the company's Model LD24 automatic hole-locating and drilling machine.

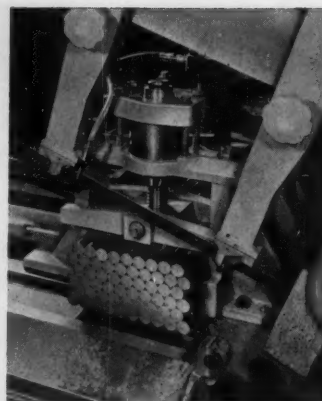
The programmer delivers up to 140 simultaneous closing contact signals. Once the vinyl tape has been prepared by punching, then rewinding and recycling are performed automatically. As it feeds, the tape activates all functions being controlled while delivering directly usable relay currents without internal or external amplification.

Indicate Item 167 on postcard, page 325

DoAll Saws, Gages, and Cutting Tools

Coliseum, Booth 528
Navy Pier, Booth 407

At the Coliseum, the DoAll Co., Des Plaines, Ill., will have its automatic power saw cutting a wide variety of tough metals, using the new Demon high-speed steel saw band. To cut stacks of small-diameter rounds, a unique hydraulic nesting fixture will be used. Synchronized with the saw cycle, the fixture automatically clamps and unclamps the rounds as needed during indexing. Also, a Model 26-3 contour sawing machine will be performing such operations as notching, shaping, slotting, and three-dimensional



Nesting fixture of DoAll power saw

cutting of duplicate work-pieces. The rapid cutting of stainless steel by friction sawing will be demonstrated on a DoAll Zephyr.

The exhibit at the Navy Pier will feature a 36-foot display based on DoAll's traveling exhibit, "Civilization through Tools." The company's line of new square gage-blocks and accessories will be on display for the first time, along with the Micro-Step system for assembling rectangular blocks into fixed or indicating gages.

Indicate Item 168 on postcard, page 325

New Lines of Cone Automatic Lathes

Machine Tool Show, Booth 401

The Cone Automatic Machine Co., Inc., Windsor, Vt., will exhibit eight automatic lathes, six

of which are bar machines, the remaining two being chucking machines. Largest of these units

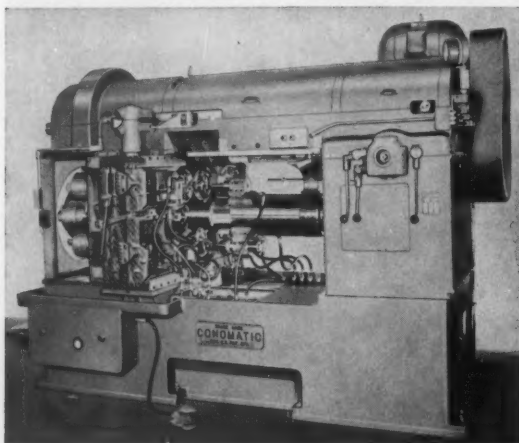


Fig. 1. A six-spindle, Conomatic chucking machine which has a capacity of 9 3/4 inches

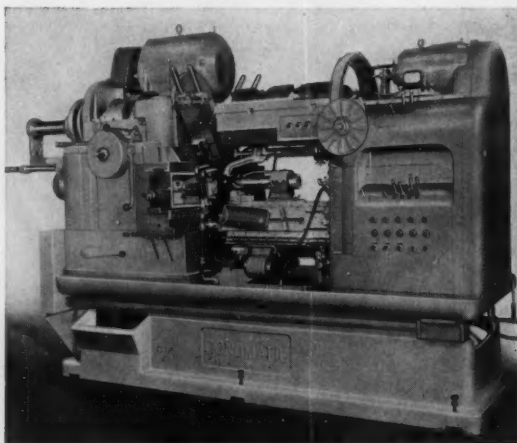


Fig. 2. Single-spindle Conomatic bar machine having a capacity of 5 inches

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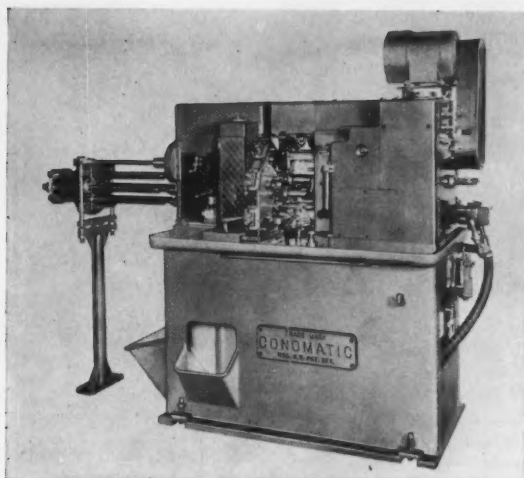


Fig. 3. Six-spindle 9/16-inch capacity bar machine is the smallest manufactured by Cone Automatic Machine Co., Inc.

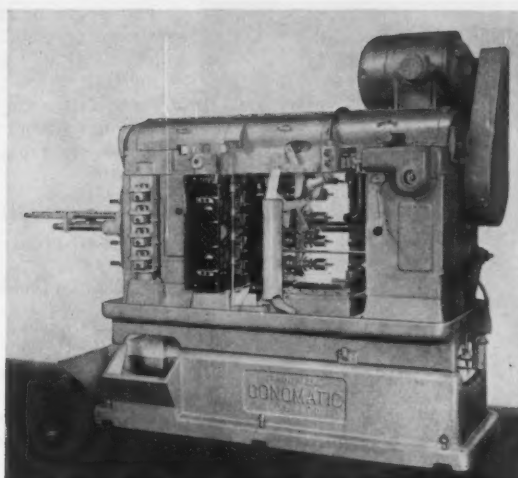


Fig. 4. Cone "4-Hi," 1-inch capacity bar machine which is able to handle four work-pieces simultaneously

is the 9 3/4-inch capacity, six-spindle chucking machine shown in Fig. 1. All six chucks on this unit are pneumatically operated. A 5 7/8-inch capacity machine of this same type, but having hydraulically operated chucks, will also be demonstrated.

A single-spindle Conomatic bar machine, Fig. 2, having a capacity of 5 inches will be part of the display. Designed for heavy work, it will be demonstrated machining bars of 4 3/4-inch diameter SAE B1113 steel in a set-up utilizing carbide tooling. Of further interest will be a 9/16-inch capacity, six-spindle bar machine, Fig. 3. Heretofore, the smallest capacity unit built by the company has

been a 7/8-inch, four-spindle machine. This new automatic lathe will be set up to produce valve-seat screws from 3/8-inch hexagonal brass bars.

Included in the exhibit will be a "4-Hi" machine, Fig. 4. Claimed to be unique in its field, it is a 1-inch capacity unit that will form, chamfer, and cut off studs from four steel bars simultaneously. The bars are fed through four individual work-spindles. A pick-off attachment is featured that holds the work-pieces for the four cut-off blades.

The company's most recent design in the eight-spindle line is the Model VE, 1 5/8-inch capacity machine, illustrated in Fig. 5.

This unit features both heat-treating and quenching facilities at one of the eight tooling positions.

A 3 1/2-inch capacity, four-spindle machine will be shown producing simulated outer bearing races from cold-drawn steel bar stock. This machine, Fig. 6, is one of seven in the company's line of quick job-change machines covering four- and six-spindle requirements. Also to be demonstrated is the Model TF 1 5/8-inch capacity, six-spindle Conomatic bar machine. All of the tools employed for machining outside work surfaces are made of carbide.

Indicate Item 169 on postcard, page 325

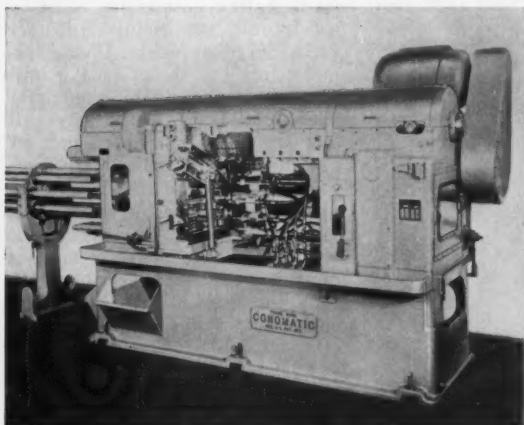


Fig. 5. Heat-treating and quenching facilities are provided in one of eight tooling positions on this Conomatic

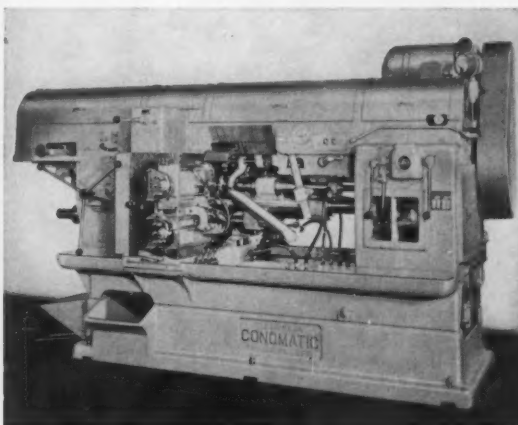


Fig. 6. Four-spindle, 3 1/2-inch capacity bar machine which is to be exhibited by Cone Automatic Machine Co.

Preview of the Chicago Shows



Hydra-Power press brake which has a 12-ton capacity

O'Neil-Irwin Exhibits Press Brakes

Navy Pier, Booth 125
Coliseum, Booth 653

Two new press brakes, one operated by hand and the other hydraulically, are among the machines being demonstrated by the O'Neil-Irwin Mfg. Co., Lake City, Minn. The hand-operated, 24-inch Di-Acro press brake has an 8-ton capacity and incorporates a special cam-lever mechanism. A ratchet-drive system multiplies the power for heavy forming work.

In the accompanying illustration is shown the 12-ton Di-Acro Hydra-Power press brake which has a bed and ram 36 inches long.

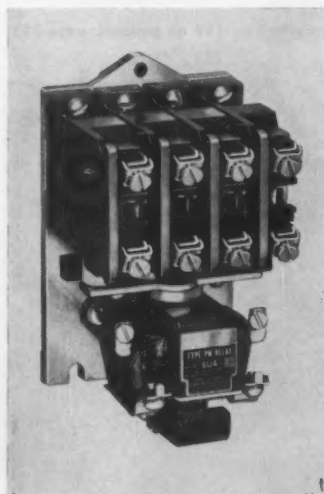


Fig. 1. Machine and press relay to be exhibited by Clark Controller Co.

The length of stroke for each job can be pre-set by adjusting a selector, without having to readjust the bed or die settings. Also featured is the control of ram speed by foot-pedal pressure.

Indicate Item 170 on postcard, page 325

Sun Oil to Offer Lubrication Service

Machine Tool Show, Booth 112

Sun Oil Co., Philadelphia, Pa., will have product storage space at the International Amphitheatre, and will be prepared to supply exhibitors with cutting oils, lubricating oils, hydraulic oils, greases, and appropriate solvents. Also, the services of trained lubrication specialists will be available.

The company will be equipped to transport products from their storage area direct to exhibitors' booths. Personnel, upon request, will assist in filling and draining equipment.

Indicate Item 171 on postcard, page 325

Clark Control Equipment

Navy Pier, Booth 840

A new relay for machine tool controls, press controls, and similar devices will be shown for the first time by Clark Controller Co., Cleveland, Ohio. This Type PM relay, Fig. 1, is designed for heavy-duty service, yet occupies little space. It features a modular

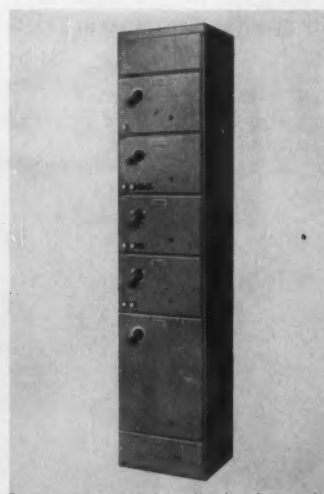


Fig. 2. Clark control center offers space-saving advantages

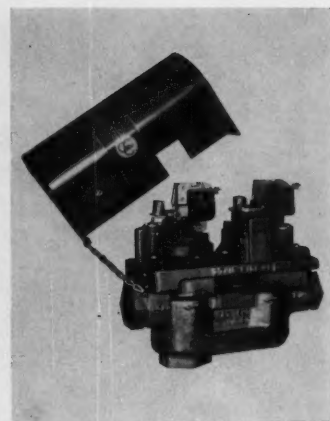


Fig. 3. Clark pilot-operated magnetic air valve for power presses

design with each contact assembly being mounted on a separate, detachable melamine block. Individual poles can be readily removed, and contacts easily converted from normally open to normally closed positions. A wide variety of standard relays is available which have from two to twelve poles.

Also to be shown for the first time is a control center, Fig. 2, which permits a number of motor starters to be installed in a small space. The control center is 20 inches wide, 14 1/2 inches deep, and 90 inches high, and accommodates six Size 1 or Size 2 starters. A bank of these vertical units can be installed in a confined space because all internal apparatus can be assembled or removed from the front.

A pilot-operated magnetic air valve, Fig. 3, consisting of both an operating unit and a stand-by safety unit, has been designed for increased press safety. Under normal conditions the operating unit controls air flow to the press clutch and brake. The safety unit stands by, operating to cut off pressure and to exhaust air from the press should the operating unit fail. Because the safety unit functions only in emergencies, it is not subject to the same amount of wear as the operating unit, thus the possibility of simultaneous unit failure is practically eliminated.

Included in the display will be a magnetic-amplifier speed control with no tubes or moving parts, and a heavy-duty machine limit switch. The magnetic-amplifier speed control is a full-wave,

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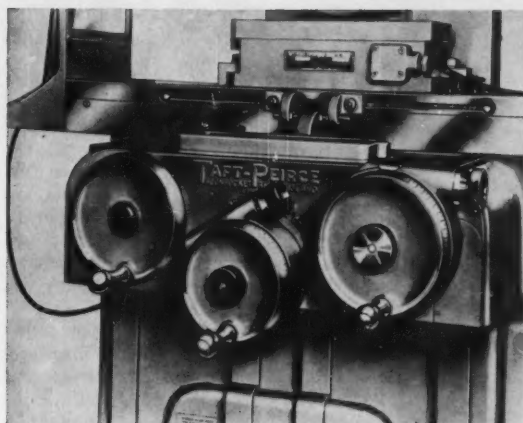


Fig. 1. Vernier fine-feed attachments for vertical and cross feeds on surface grinder



Fig. 2. Taft-Peirce automatic air-electric gage unit in operation on production line

self-saturating unit with a standard speed-control range of 10:1. The limit switch is conservatively rated at 10 amperes continuous

capacity up to 600 volts alternating current or 550 volts direct current.

Indicate Item 172 on postcard, page 325

resulting in greater magnetic work-surface area.

New superpowered sine-angle magnetic chucks greatly facilitate angular grinding. Both a compound sine-angle permanent-magnet model and a simple sine-angle electromagnetic model will be exhibited. The latter is shown in Fig. 4.

Small tools to be exhibited include a variety of set-up and inspection equipment, such as sine blocks, bench centers, steel and box

New Products in Taft-Peirce Exhibit

Machine Tool Show, Booth 811

Among the machine tools and accessories, fixed and air gages, magnetic chucks, and small tools that will be exhibited by the Taft-Peirce Mfg. Co., Woonsocket, R. I., will be a variety of new products. Vernier fine-feed attachments for vertical and cross feeds which permit grinding to 0.0005 inch on the company's No. 1 precision surface grinder are shown in Fig. 1. A precision feed-screw and nut eliminates any tendency for the saddle to jump when side-wheel grinding or form grinding to 0.0001 inch or under.

The air-gage display will consist of standard, computing, and air-electric Comp-AIR-ators, and an automatic gaging unit. Included will be an automatic, air-electric gage, Fig. 2, which will be in operation. This unit simulates an actual gaging set-up installed in an automotive production line. The internal diameters of eight cylinder bores in V-8 engine blocks are simultaneously inspected after rough boring operations. A contact type air-gaging head is utilized to gage the rough surfaces of the bores.

Permanent-magnet chucks with a new faceplate design will also be shown. Three sizes of these chucks, 3 by 6 inches, 5 by 12 inches, and

10 by 15 inches, are illustrated in Fig. 3. The new design incorporates magnetic poles extending to the edge of the top faceplates, re-

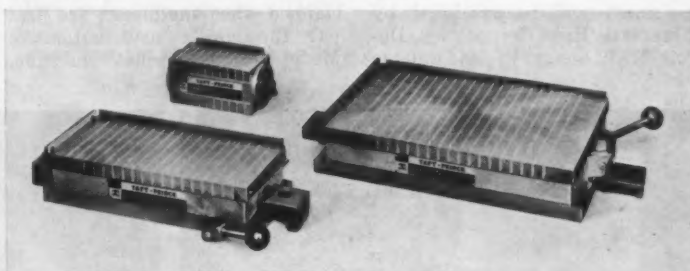


Fig. 3. Permanent-magnet chucks shown in three sizes



Fig. 4. Simple sine-angle electromagnetic chuck



Fig. 5. Simple sine-angle plate of 0- to 90-degree range

Preview of the Chicago Shows

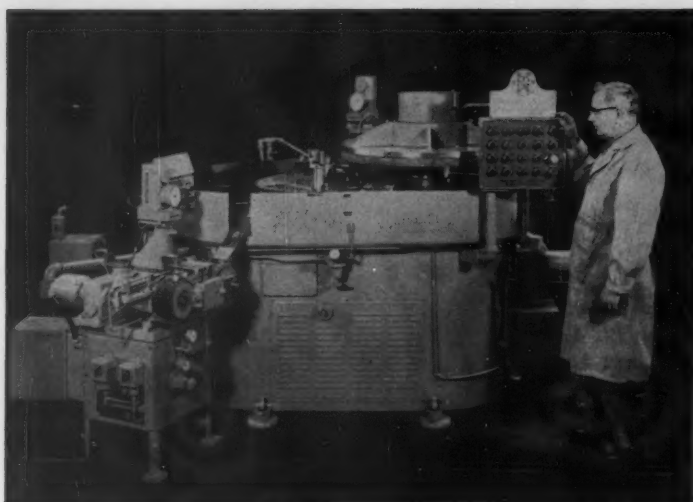


Fig. 1. Gear-blank end faces are honed flat and parallel on "Microflat" honing machines

parallels, and surface plates. Both simple and compound sine-angle plates will be shown. The former is shown in Fig. 5. Either model is easily set at any angle from 0 to 90 degrees by means of standard gage-blocks.

Machine tools in action will be

the No. 1 surface grinder, a 6-inch rotary surface grinder, a 24-inch rotary lapping machine, and a back spot-facing machine. In addition, three Rotocheck automatic thread-gaging units will be in operation.

Indicate Item 173 on postcard, page 325

Micromatic Honing Equipment

Machine Tool Show, Booth 1211

A variety of surface finishing equipment will be exhibited by Micromatic Hone Corporation, Detroit, Mich. Longer life and quieter

operation of pinion gears are claimed when the blanks are first put through a new automatic Model 836-2 "Microflat" machine,

Fig. 1. This machine finishes the two end faces of the gear blank flat and parallel, and establishes accurate control surfaces for subsequent processing. Besides automatic loading, there is a feed-back arrangement controlled by an air thickness gage to compensate for abrasive wear. There is also an automatic device for gaging parallelism and for the ejection of unsatisfactory parts. Production for this machine is rated at 1200 gear blanks per hour.

The bore of gear blanks processed on the "Microflat" machine can be honed true and to size on an automatic Model 738-C "Microhoner," Fig. 2. As the blanks are fed into the machine, they are located by the tool and clamped. The long-life diagonal stone tool, controlled by a new "Microdial" automatic feed unit, generates a true bore. Final size is assured by a "Microsize" control. While the parts pass from the boring station, they are checked by an automatic air gage that initiates segregation of the blanks. This machine produces 120 parts per hour, removing approximately 0.004 inch of stock.

Included among the displayed equipment will be a Model 844 "Microflat" machine, Fig. 3, which has a twenty-station work-holding fixture. The machine was designed for the production finishing of flat sealing surfaces on a die-cast aluminum part. Both the abrasive and the fixture rotate continuously, with the operator unloading and

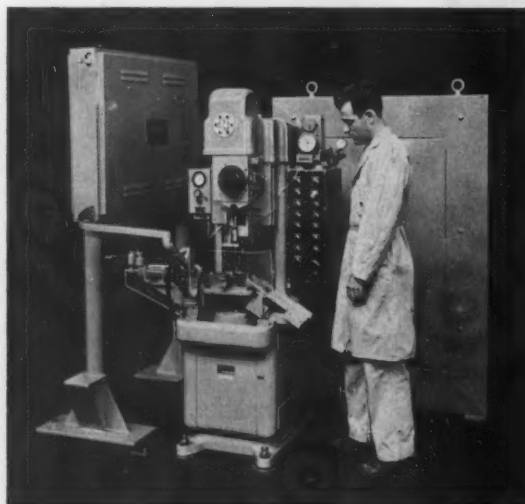


Fig. 2. Bore of gear blank is finished true and to size on a "Microhoner"



Fig. 3. "Microflat" honing machine to be displayed by Micromatic Hone Corporation

Preview of the Chicago Shows



Fig. 4. Helical splines on heat-treated gears are accurately finished on a "Hydrohoner"

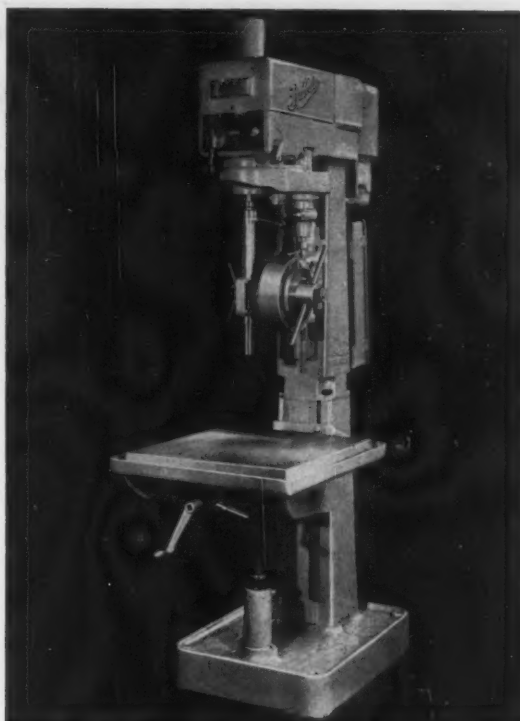


Fig. 1. New model "RPMster" drilling machine to be demonstrated by Buffalo Forge Co.

reloading the stations as they move past. A production rate of 1200 parts per hour is claimed.

Functional accuracy and surface finish can be obtained on internal helical splined surfaces of hardened gears with the Model 728

"Hydrohoner," Fig. 4. Distortion resulting from heat-treating will be corrected, and final size, form, and surface finish will be duplicated on all load-bearing surfaces at the rate of 30 parts per hour.

Indicate Item 174 on postcard, page 325

Variety of Metal-Forming Equipment to be Exhibited by Buffalo Forge

Machine Tool Show, Booth 610

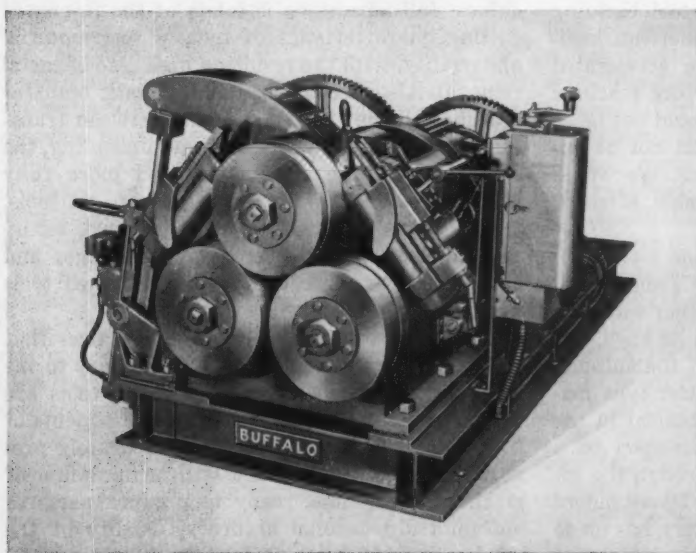


Fig. 2. Hydraulic unit for top roll adjustment on vertical pyramid bending rolls

Buffalo Forge Co., Machine Tool Division, Buffalo, N. Y., will demonstrate a new model of the "RPMster" drilling machine, Fig. 1. It is 88 inches high, has a capacity of 1 inch in cast iron and 3/4-inch in mild steel. Speed changes are in two ranges. Low range includes all spindle speeds between 100 and 550 R.P.M., and high range includes all spindle speeds between 500 and 3000 R.P.M. Maximum distance between the spindle nose and the work table is 28 inches. The spindle, which is 13 inches from the column, has a minimum diameter of 1 7/8 inches.

A hydraulic device for quick, efficient adjustment of the top roll on vertical pyramid bending rolls will be displayed. This unit, see Fig. 2, has a compact hydraulic pump, reservoir, and four-way valve built into a single unit. A master pressure relief valve pro-

(Continued on page 251)



Machine Tool Greatly to

By HAROLD R. FOSS

Director, Manufacturing Engineering
Ford Motor Co.

THE degree of development attained in machine tools has been a foremost factor in the continual advance and use of modern American industrial production methods. Constant growth of the machine tool building industry reflects the growth in American business that is going on today at an accelerated pace. Without the contribution of the machine tool builders, American industry would not be so advanced as it is. Our people would not be enjoying so high a standard of living. We would not have such an abundance of durable, efficient, and low-cost goods.

The ability of the nation's machine tool builders to constantly devise new methods and equipment for conversion of the car designer's dreams into the actual product that the public buys, has contributed greatly to the growth of the automobile industry. The automated, transfer type machinery, which now is considered typical in the automotive industry, has been developed to a high degree of efficiency largely through the efforts of the machine tool industry. Development of this transfer type, in-line machinery has made possible the realization of numerous important advantages, such as maximum utilization of tools

and equipment, and other related benefits that promote over-all economy and quality.

Through the strength and rigidity which it is now possible to build into these ingenious machines, full advantage is taken of the improved cutting characteristics of today's tool material and quality, with the resulting high rate of metal removal. Also, because of the automatic transfer feature and the absence of delay between transfer and machining, or loading and unloading, the complete machine cycle is utilized more fully than ever before. With the use of pre-set tools, that is, tools adjusted at the tool board, set-up personnel can make effective use of gages and other facilities to adjust newly sharpened tools precisely to predetermined dimensions.

This is part of the tool control practices that have been devised as a beneficial corollary to the operation of in-line machinery. When tools are replaced, the need of hurried tool adjustments at the machine is avoided, and the accurately pre-adjusted tools are installed with a minimum of machine down time, ready to produce parts of optimum dimensional accuracy. Quality of the product is further maintained through the use of "Toolometers," in which various counting and

Industry Has Contributed Industrial Progress

warning devices indicate when cutting tools are about to become dull. Operating personnel is, therefore, enabled to prepare for a tool replacement, insuring that parts are always produced with the desired finish and accuracy.

With all these developments, which are logical continuing improvements, together with many others, which might be enumerated, productivity has been substantially increased with less physical effort. Increase in productivity as a result of technological advances is an evident need to satisfy ever greater demands for goods and services for our rapidly growing population. Furthermore, productivity must be constantly improved to meet today's vigorous competition. Competition is the driving force that keeps America going ever forward. Competition makes available to the public quality goods and services at the lowest possible cost.

Technological advancements have contributed much to the high standard of living of American families. Automobiles and home appliances of all kinds are common in the homes of most families, instead of only in a privileged few. Economical gains obtained with automated equipment are passed on, in various forms, to the public and our employes. Automatic transmissions, increased engine power, fresh air heaters, curved windshields, turn indicators, improved wheel suspensions, power steering, power brakes, and safety belts are some of the features that have improved the over-all performance of our automobiles and made driving easier, safer, more comfortable and enjoyable.

While the value of automotive products has greatly increased each year, we have been able to hold the price line, although labor and material costs have constantly increased. This has been possible principally because of the economical gains obtained through the use of automated equipment. In addition to reducing the physical effort for the worker, the automated machinery of today offers increased opportunities for the exercise of talent and imagination of the individual. Industry will need an increasingly larger number of specialized craftsmen of all kinds in the mechanical, hydraulic, pneu-

matic, and electrical fields, who can operate and service larger and more complex batteries of machines.

The Ford Motor Co. has invested approximately \$1,700,000,000 in facilities and equipment since the end of the year 1946. In addition, the Company is committed to the expenditure of an additional \$625,000,000 over the next three years. In order for these facilities and equipment to remain an asset and assure a fair return for the substantial capital invested, production lines must be kept running.

Extensive or frequent down time in production lines would defeat the purpose for which they were built, and nullify the projected economical gains. We are all familiar with the drawbacks, losses, and difficult situations arising from unexpected or too frequent breakdowns, many of which are traceable to apparently insignificant details. Loss of production is by far the most damaging type of loss. In addition to the man-hours lost directly in a particular line, adjacent and related lines in other plants may become affected, multiplying the original loss many-fold. Therefore, every effort should be made to anticipate all possible causes of machine down time, and to incorporate in the machine every essential reliability feature at the planning stage.

At the Ford Motor Co., we consider that one of the most important contributions an individual can make to our company is to do an adequate, thorough planning job, considering all of the essential elements of the process, beginning with the tool, and extending through the fixture, into the machine and all of the associated or related operating mechanisms and components. Machines must be designed with adequate strength, rigidity, and weight to insure accuracy of the product manufactured. Also, the machines must be free from vibration and objectionable deflections that would limit the potential of the tools intended for the operation.

Actuating components and controls must be carefully selected, to provide ample capacity for the operation, and trouble-free performance. Perishable and semi-perishable components and tools should be readily accessible to set-up and

maintenance personnel, to avoid unnecessarily extended down time. Also, toward the same end, installation of electrical and hydraulic components should be made in accordance with the applicable standards, codes, and engineering practices.

These needs for machine reliability are mentioned with full knowledge that most of the nation's machine tool builders are aware of all these problems, and indeed, have done much to alleviate them. However, the emphasis is still necessary, for as long as these problems are not solved, we remain faced with the prospects of excessive down time and loss of production.

At the Ford Motor Co., the selection of machine tools in the future, as in the past, will continue to be based on one determining criteria—improved machine features and increased productivity. In analyzing the equipment of our most successful previous operations and in anticipation of future machinery equipment, we feel that the following points should be the governing considerations in the machinery builder's designs and in our purchases of future machine tools: (1) productivity; (2) flexibility; (3) low operating and maintenance costs; and (4) initial cost.

In the attainment of the present degree of development of production equipment, we can look with great satisfaction at some of the recent, most significant advances of the machine tool industry.

We know, for example, that parts can be produced in large volume and at the lowest possible cost in a sequence of operations where the workpiece is moved from station to station by mechanical means, whether on small rotary or dial machines, or on large transfer lines. We also are well aware of the fact that most of this expensive and complex equipment—although it produces parts at high-production rates—lacks the necessary flexibility to permit rapid adaptation of changes in product design.

The ultimate effect of these two factors—(1) lack of flexibility and (2) cost of obsolescence—may be detrimental to the consumer, the machinery builders, the automobile industry, and

the economy in general. The automotive industry each year spends millions of dollars for high-production, single-purpose machinery. The cost of "obsoleting" this special equipment or reworking it to incorporate an improved product design, must be weighed finally against the potential increase in sales of the end product.

As the investment in tooling costs increases, the factors of risk involved in the decisions become proportionately greater. Certainly, it is no solution for a manufacturer to avoid making the decision and make no changes until forced to do so by the pressure of competition. Indeed, the final effect of a policy of avoiding risk in tooling investment would be to prevent improved products from reaching the consumer.

To provide flexibility and reduce the problem of obsolescence, we at Ford Motor Co., in the next few years, anticipate the development of "unitized" machine tools. These special machines will be capable of being used like "building blocks" to meet the particular operational requirements of the product.

As the product changes, new individual units may be added to the machine, or they may be removed or rearranged to provide the most operational sequence and thus permit the production of parts in machine tools with improved features and higher productivity.

Development of these so-called "unitized" machine tools will definitely fulfill the basic considerations outlined as being paramount in the selection of new equipment.

The intelligent and practical use of machinery has been the difference between up-to-date living, with all its conveniences, and the primitive way of life so common to those countries relying on manpower alone. The individual's skill—or even the skill of an entire industry—is no longer sufficient to cover adequately all phases of today's complex production requirements.

Teamwork in industry, to be truly effective, should not be limited to a single company or a group of companies. Rather, it should extend to all of the suppliers of that industry, the machine tool builders, the tool and die shops, the part manufacturers, and other related industries.

Preview of the Chicago Shows

fects the system against overload. The pump and motor run only during the adjusting cycle, then shut off. A direct-reading scale can be provided.

Also to be exhibited will be a new hydraulic billet shear, two universal iron workers, a structural iron worker, a No. 10 billet shear, and a variety of drilling machines.

Indicate Item 175 on postcard, page 325

Sidney Lathes Feature Design Changes

Machine Tool Show, Booth 1116

Among the lathes to be displayed by the Sidney Machine Tool Co., Sidney, Ohio, will be Model 32 Dial-Matic engine and toolroom lathes, such as the one seen in Fig. 1. Featured design changes include increased rigidity, greater bearing area, and simpler, more convenient, single-dial control on all working units. Also, greater production capacity has been achieved by increasing the swing of the lathes.

Increased rigidity and productivity are also features of the Model 16 engine and toolroom lathe, Fig. 2. On these machines, greater accessibility has been provided to all points of control for improved operator convenience. One of the Model 32 Dial-Matic lathes at the Show will be provided with the Sidney Fluid Tracer unit, Fig. 3. With this unit there is no decrease in swing capacity over the compound rest. The machine can be changed from contour duplicating to standard lathe operation in sixty seconds or less without adding or removing parts.

Herringbone geared-head type transmissions have been incorporated in all new models. All shafts in the headstock, gear-box, and apron are supported on anti-friction bearings. Beds are of four-wall, bridged type construction, with hardened and ground tool-steel ways. Oil and chip pans provide greater accessibility for the removal of chips. A separate lead-screw and feed-rod are provided on each lathe, and the tailstocks have graduated dials for direct reading during drilling and boring operations.

Indicate Item 176 on postcard, page 325

Fig. 3. Fluid Tracer unit used on lathe for contour duplicating work.

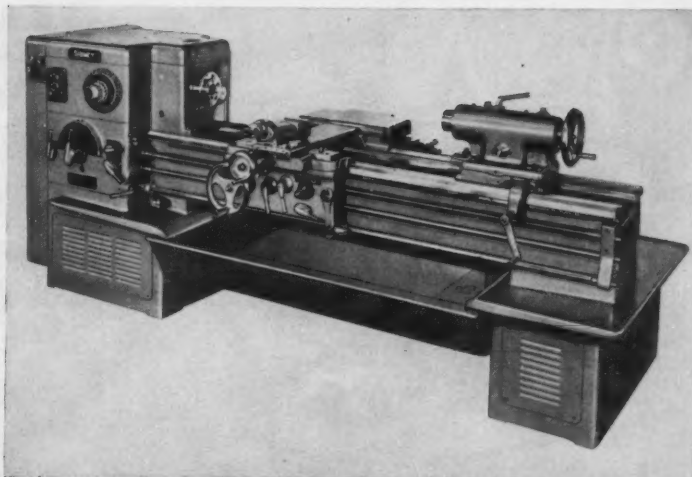


Fig. 1. Sidney Dial-Matic lathe with single dial control on all working units.

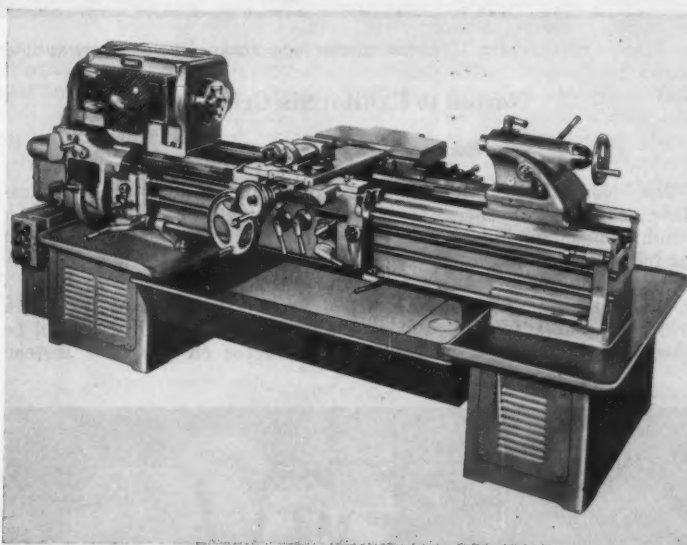
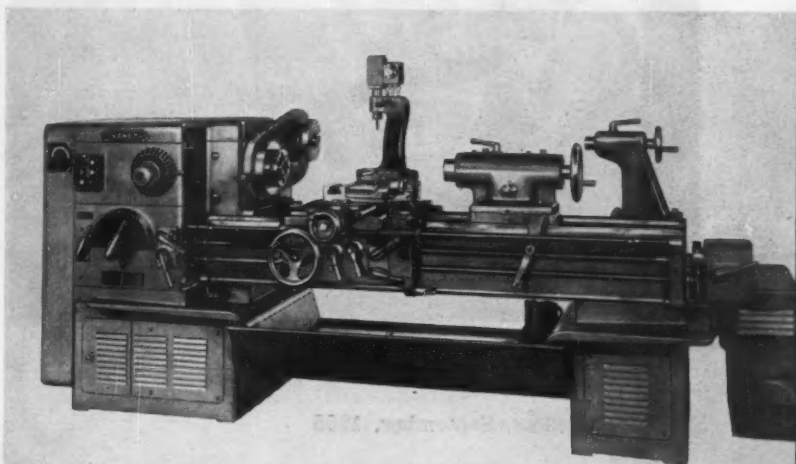


Fig. 2. Increased rigidity and productivity are features of this Model 16 lathe.



Preview of the Chicago Shows

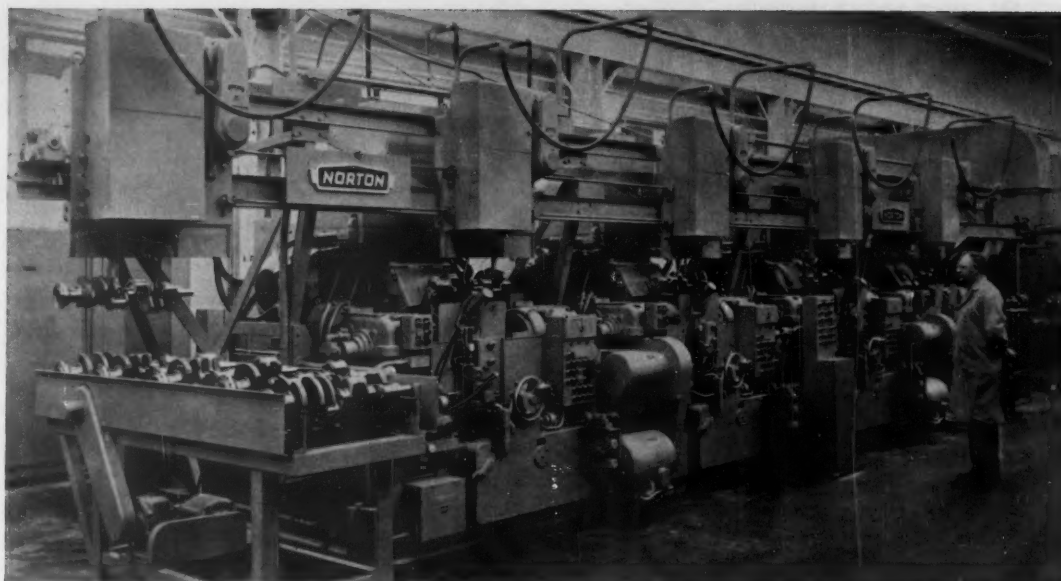


Fig. 1. Norton transfer type crankpin grinder features automatic grinding cycle

Norton to Exhibit Six Grinders

Machine Tool Show, Booth 516

The Norton Co., Worcester, Mass., will show in operation six grinding machines which include the following: an automatic transfer type crankpin grinder, a multiple-wheel grinder, a universal grinder, a semi-automatic angular wheel-slide grinder, a hydraulic

cam grinder, and a cylindrical grinder. All of these machines, with the exception of the last named, are being exhibited for the first time.

The transfer type crankpin grinder, shown in Fig. 1, will be constructed on one base instead

of the two sections normally used in order to conserve space at the Show. On this machine, crankpins of automobile crankshafts go through a continuous grinding cycle, with the work being automatically transferred from station to station as each crankpin is completed in sequence. Gages at each station terminate the grinding cycle when crankpin diameters have been reduced to the desired size. At predetermined intervals, wheels are trued automatically and advanced to compensate for reduced size.

The multiple-wheel machine, Fig. 2, completes the diameters on crankshafts and camshafts, and transmission and motor shafts in a single, automatic plunge grind. It is available in 10- by 30-inch and 14- by 30-inch sizes, and has a spindle that accommodates a 36-inch wheel. Straight or formed wheels in any desired combination can be used, and they can be automatically trued at the same time.

Illustrated in Fig. 3 is a Type U-4 universal grinder, made to handle 36- or 48-inch work lengths. Set-up time for internal grinding is reduced by a swiveling headstock having a dog drive-plate on one end and a cam-lock nose on its other end for mounting chucks or fixtures. This grinder has a work speed range of 40 to 400 R.P.M. available in an infinite number of increments. A hinged-

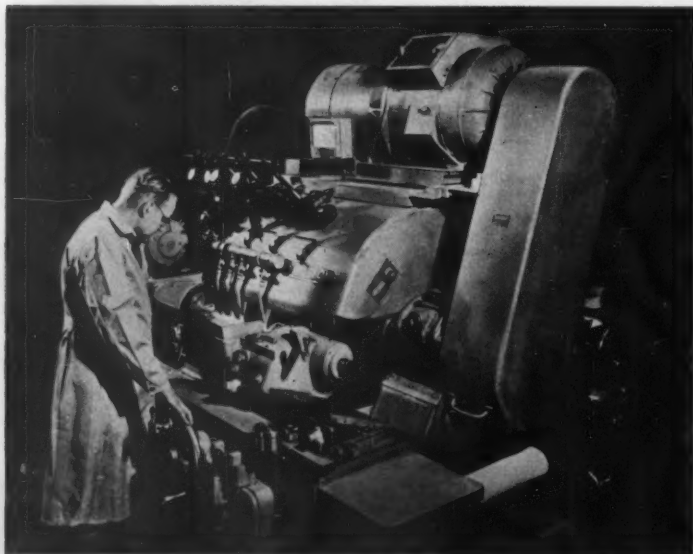


Fig. 2. Multiple-wheel grinder designed to complete several diameters on a shaft simultaneously

Preview of the Chicago Shows

bracket type internal grinding spindle reduces set-up time.

A 10-inch Type CV-4 semi-automatic angular wheel-slide grinding machine completes thrust surfaces and adjacent diameters in a single plunge movement. It leaves a concentric grain pattern in the finish. Normal operation requires merely that the operator load the work, manipulate a control lever which starts the cycle, and then remove the work after an electrically timed termination of the grind. An optional wheel guard type truing device functions at the touch of a push-button. The machine is available in work lengths of 18, 36, 48, and 72 inches.

A No. 3 Cam-O-Matic grinder is designed for automobile camshafts. This machine utilizes a Gilmer timing belt for a positive work-rotation. Smooth work rotation results, since slippage is eliminated. Truing of the grinding wheel is accomplished by a hydraulically operated truing device mounted on the wheel guard.

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Boye & Emmes Engine Lathe

Machine Tool Show, Booth 310

The Boye & Emmes Machine Tool Co., Cincinnati, Ohio, will present an engine lathe, here



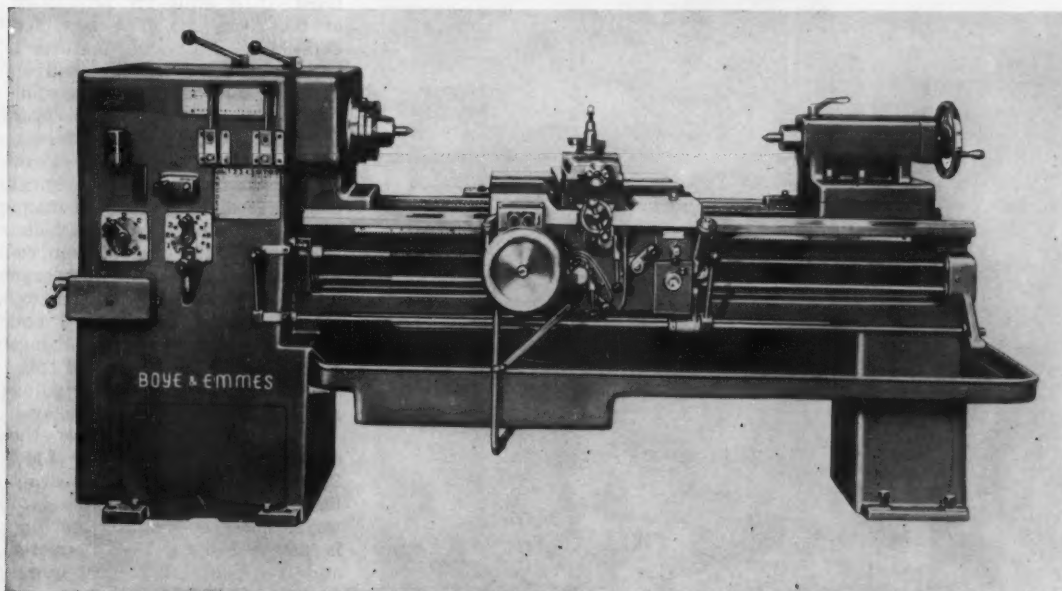
Fig. 3. Universal grinder made by Norton features swiveling headstock

illustrated, with automatic longitudinal and cross stops which are operated electrically in either direction of travel on the carriage or cross-slide. This machine has an 18 1/2-inch swing over bed and carriage wings, and a distance of 54 inches between headstock and tailstock centers. Among other features are a stainless-steel lead-screw; electrically operated braking; and longitudinal power traverse through finger-tip control.

The headstock is designed to

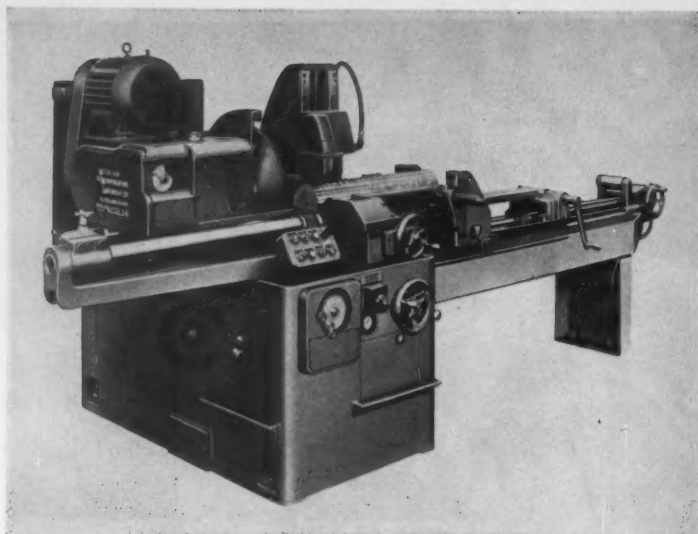
give eighteen spindle speeds in geometric progression, obtained through fifteen wide-faced gears, thirteen of which are in constant mesh. The back-gear pinion and face gears are of the herringbone gear type. Twelve of the eighteen speeds pass through this herringbone gear set. The quick-change gear-box furnishes sixty-three thread and feed changes, including 11 1/2 and 27 threads per inch.

Indicate Item 178 on postcard, page 325



Boye & Emmes engine lathe with electrically operated longitudinal and cross stops

Preview of the Chicago Shows



Motch & Merryweather circular sawing machine

Motch & Merryweather Sawing and Milling Machines

Machine Tool Show, Booth 606

New machines to be shown publicly for the first time by the Motch & Merryweather Machin-

ery Co., Cleveland, Ohio, include a circular sawing machine, a circular saw blade sharpener, and a

production milling machine. The No. 2-8-A sawing machine, here illustrated, features an enveloping worm drive to a helical pinion and spindle gear with special provision for backlash take-up. Six spindle speeds are obtained by means of a dial in the saw head.

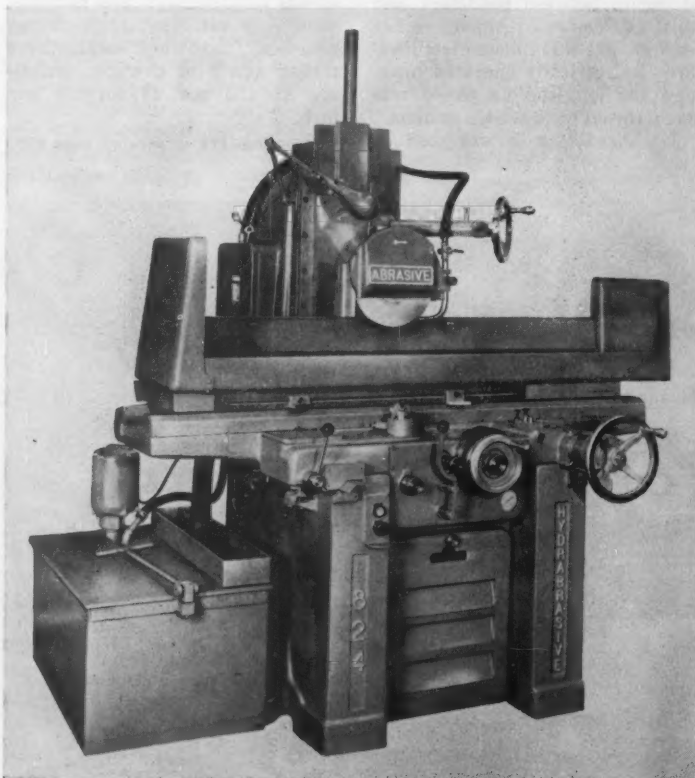
The blade sharpener accommodates blades with diameters of 8 to 45 inches. At one setting, it is able to grind high and low teeth alternately. The grinding contour is automatically produced by cam action with index-plates controlling the tooth spacing.

The bed type, production milling machine has spindle speeds ranging from 25 to 1230 R.P.M. Table feeds are 1 to 81 inches per minute. An involute spline on the spindle provides an efficient means of power transmission, regardless of the position of the quill. Mounted on the input shaft is an electric clutch brake, which also serves as a spindle lock for easy tool removal.

Indicate Item 179 on postcard, page 325

Surface Grinder by Abrasive Machine Tool Co.

Machine Tool Show, Booth 317



Hydraulic-feed surface-grinding machine built by Abrasive Machine Tool Co.

The Abrasive Machine Tool Co., East Providence, R. I., will introduce the Model 824 hydraulic-feed surface-grinding machine in their display of grinding equipment. It is built for production or tool-room use. The new machine, here illustrated, features a ball-supported cross-slide and an accurate anti-backlash cross-slide feed-screw which facilitate close-tolerance grinding of shoulders.

The company will also show its Dustsnare, a filterless dust exhauster and separator that operates on both the cyclone and vacuum principles for efficient removal of light particles from large areas. Other machines to be exhibited are the Models 1 1/2 and 1224 surface-grinding machines with stepless, variable-speed spindle, and an 18-inch face-grinding machine for rapid stock removal.

Model 1224 incorporates the same new features as the Model 824, including a separate hydraulic unit and patented shielded ways. The face-grinding machine is powered by a 15-H.P. motor and is capable of accurately removing 1/4-inch of stock per pass.

Indicate Item 180 on postcard, page 325

Pratt & Whitney Machines and Accessories

Machine Tool Show, Booth 1219

Pratt & Whitney Division Niles-Bement-Pond Co., West Hartford, Conn., has an array of new equipment on exhibit. The Keller tracer-controlled milling machine, Model C, is seen in Fig. 1. Heavy and rugged, this machine is designed to accommodate large work. Spindle power has been increased to 10 H.P., and a wide range of spindle speeds (30 to 3600 R.P.M., in twenty steps) has been provided. Slides have phenolic-to-metal bearing surfaces throughout, and lead-screw nuts are phenolic molded. The working surface of the table is 48 by 30 inches. Rapid traverse for vertical and horizontal machine movements is optional. An automatic chip removal and coolant system increases the productivity of the Model C.

Straight or tapered holes can be rapidly produced on the No. 2E vertical precision hole grinder, Fig. 2. Grinding speeds range from 4000 to 100,000 R.P.M., and the table has a working surface of 22 by 44 inches. This machine is unusual in that work is strapped to the table and does not revolve. The grinding wheel has a planetary motion around the axis of the work hole, and feeds radially outward. This feature makes it possible to locate and grind any number of holes of varying size in a work-piece, without disturbing the initial set-up.

The grinder incorporates the Pratt & Whitney Electrolimit measuring system. Table settings accurate to 0.00001 inch are quickly made. Three interchangeable pneumatic grinding heads are available. The spindle floats on air bearings, providing extreme precision and cool performance. Designed primarily for dry grinding, the No. 2E is equipped with a dust collector.

The Velvetrace milling machine, Fig. 3, reproduces fine detail of almost all three-dimensional models within its work capacity of 12 by 9 inches. It contains a tracer point that follows the model, but without mechanical contact. Basically, the tracing system utilizes a minute spark gap of harmless high-voltage low-amperage current between the tracer and the model. The surface of the model

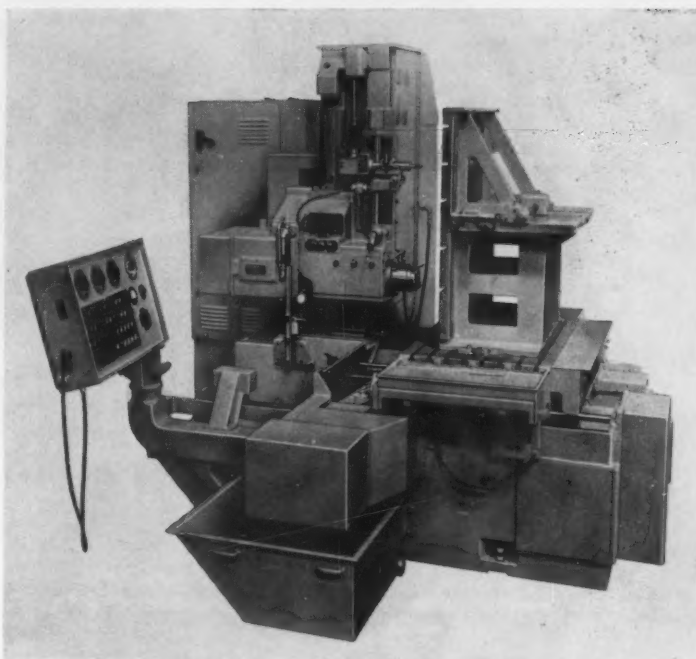


Fig. 1. Keller tracer-controlled milling machine for large work announced by Pratt & Whitney

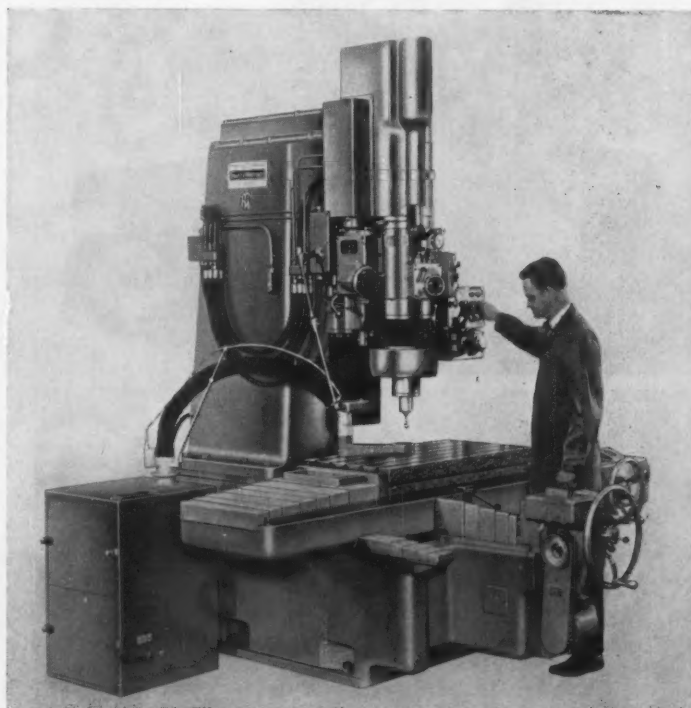


Fig. 2. Pratt & Whitney vertical precision hole grinder, having a planetary motion of the grinding wheel

Preview of the Chicago Shows

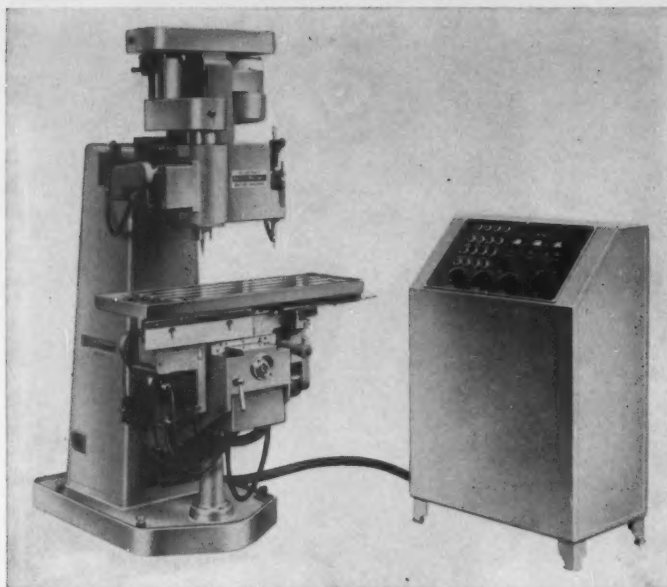


Fig. 3. (Top) Velvettrace milling machine operates without mechanical contact of the template



Fig. 4. (Center) Rotary table for inspecting or locating large work

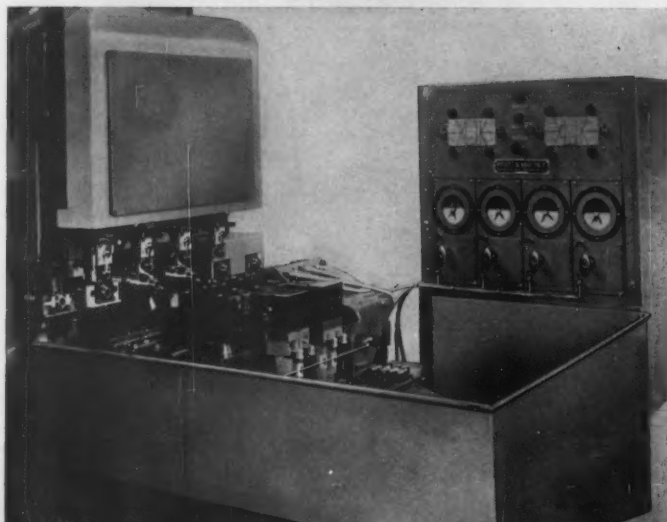


Fig. 5. (Bottom) Automatic machine control gage

is made electrically conductive and is grounded to the machine. Any slight variation in the gap produces a proportional change in the voltage, which is instantly amplified and directed to magnetic clutches controlling the spindle quill and the table and saddle slides.

Operation of the machine is completely automatic. The table is set to travel in a series of passes, step-feeding the saddle at the end of each pass. If desired, the saddle can be the traversing member, step-feeding the table. The spindle quill "roll feeds" on pre-loaded ball bearings.

For inspecting large objects, the precision 48-inch rotary table seen in Fig. 4 is now available. It can also be used to provide accurate location on heavy equipment for boring, facing, and other machining operations. Table dial graduations are direct-reading to 1 minute of arc, and vernier graduations are direct-reading to 2 seconds. A 3/4-H.P. reversing motor permits rapid rotation of the table in two directions.

An Air-O-Limit machine control gage, Fig. 5, provides for in-process measurement and automatic feed-back correction. It furnishes step impulse changes to the machine controls for tool resetting to maintain tolerances. Rejects cause the machine to stop. The application illustrated is a four-station unit on a New Britain-Gridley automatic dual boring machine. Each unit has a calibrated air indicator for direct diameter reading. Lights in the control cabinet signal out-of-tolerance warning. Precision relays and electrical pressure switch operate on a dimension change of only a few millionths of an inch. Control limits can be pre-set to any desired portion of the scale to meet varying tolerance requirements.

Two additional rotary table styles are shown in Figs. 6 and 7. The 24-inch plain table, Fig. 6, in-

Preview of the Chicago Shows

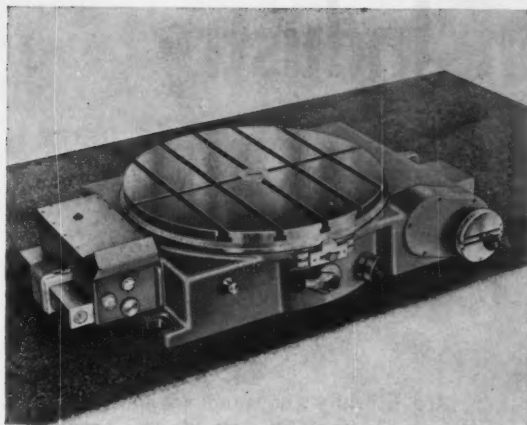


Fig. 6. Plain optical 24-inch diameter rotary table

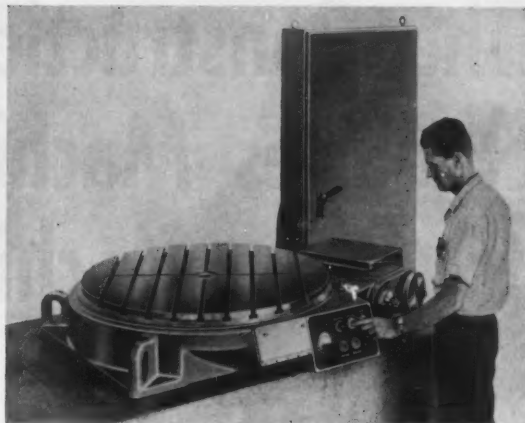


Fig. 7. Rotary table with automatic positioning

corporate an easily read, projection optical system for accurate circular spacing or angular positioning. It can be used in conjunction with a jig borer or similar equipment, or independently for high-precision inspection. A glass master disc gives basic 5-minute settings. These, in turn, are subdivided optically into 300 equal parts for settings to 1 second of arc.

The 42-inch table seen in Fig. 7 automatically positions work to any desired angle by means of adjustable dogs. Table dial vernier graduations read to 2 seconds of arc. Once index points have been established, the operator has only to press a push-button, and the table automatically indexes from one point to the next. Each index point is located by the dogs electromagnetically without physical contact. The table drive is so arranged that four speeds are introduced automatically in the indexing cycle—a fast approach, a second speed slow-down when the index point is reached, a third speed which reverses rotation, and a fourth speed for final zeroing. A binder clamping mechanism is interlocked with the table movement.

The Sigmatic gaging machines, Fig. 8, automatically inspect up to fifty physical dimensions at one time with extreme accuracy and rapidity. Also, they can be adapted to inspect, count, and sort a wide variety of components for selective assembly. Two gaging heads are available. The Micro-Air gage with a Liquicolumn panel provides positive dimensional readings. The Micro-Limit gage with a light signal panel gives plus, minus, and

“O.K.” signals for each of the various dimensions.

Another new machine on display is a No. 3C die-sinker, Fig. 9, capable of handling heavy dies with facility both under manual operation and under hydraulic tracer control. The table has a travel of 14 by 24 inches, with a working surface of 15 by 40 inches. The knee is counterbalanced by a hydraulic cylinder, in which pressure can be changed according to the die weight. To move the table car-

riage easily, there are servo valves, controlled through handwheels, which operate hydraulic assists.

One of the control units for a jig borer that is presently being developed will also be on exhibit in the Pratt & Whitney booth. With these units, numerical information is fed into the machine to cause the work-table automatically to position itself to 0.0001-inch accuracy. Maximum time required to

(Continued on page 260)

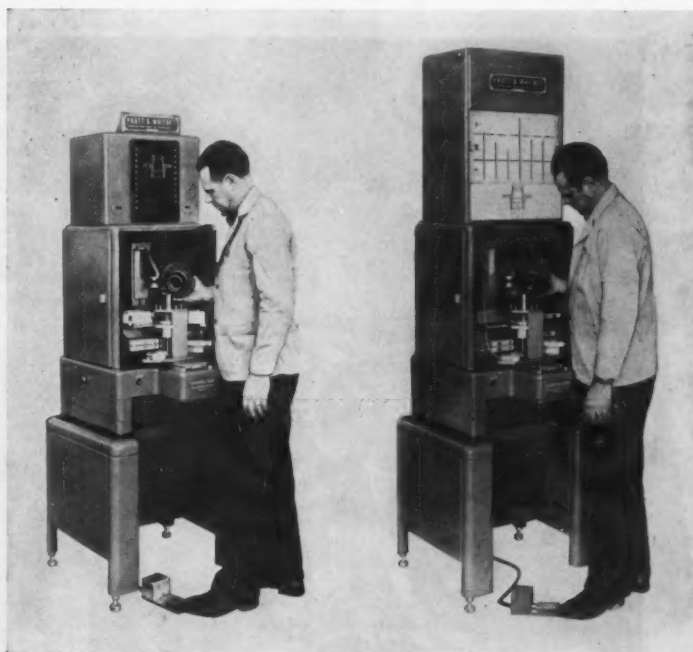


Fig. 8. Sigmatic automatic gaging machines

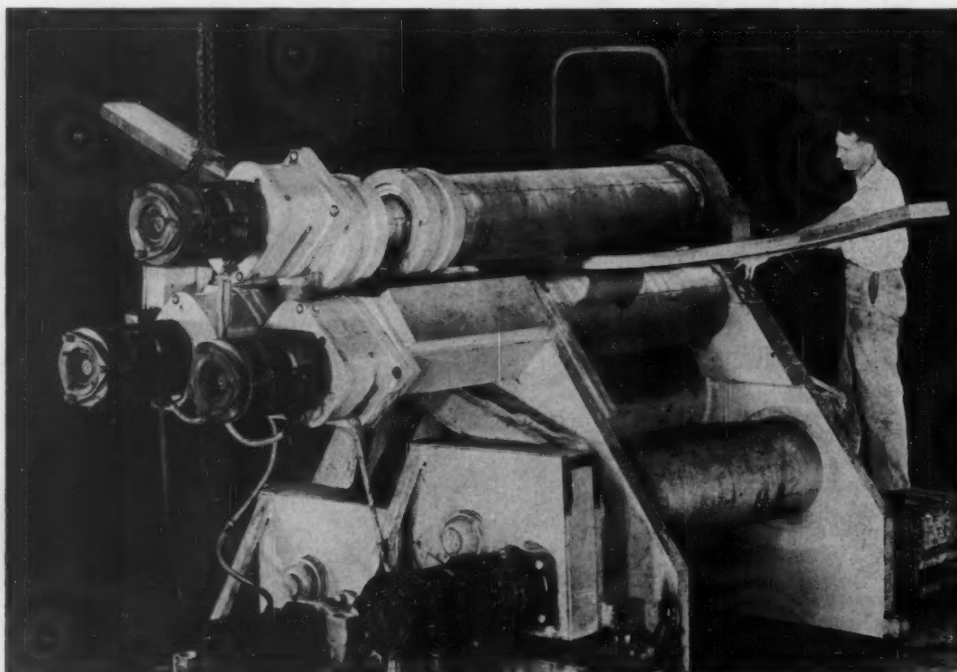
The Construction Industry Requires Machines to Make Machines

ORDINARILY, when the average person thinks of machinery, he thinks of tractors on the farm and harvesters to thresh the grain, refrigerators in our homes, and lawn mowers to cut the grass, automobiles, railroad trains, airplanes and construction machinery. But behind all these, there is a great reservoir of machinery that the average person knows little about and seldom thinks of. Yes, he knows that there are a lot of people employed in the factories that make automobiles, and he supposes that they have acquired some skills by which they make the automobiles. As a matter of fact, automobiles are not made by men's hands—they are made by machine tools, and the machine tools themselves are made by similar and other machine tools.

In order to produce a modern farm tractor,

there are literally thousands of precision machine tools set up. The simplest farm tractor is composed of many hundreds of accurate parts made and gaged to within a fraction of a thousandth of an inch. One part often requires a number of machine tools costing thousands of dollars each to make it. And in many cases you will see a part being passed from one machine to another without being touched by human hands. Master gages are kept in an air-conditioned room, and they are so accurate that the handle of the measuring device needs to be insulated because the heat of a human hand would change the reading of the measuring instrument.

Machine tools are the backbone of industry. You wouldn't try to produce even a jack-knife or a pencil without them. The rolls in a steel mill



By R. G. LE TOURNEAU, President

R. G. Le Tourneau, Inc.



that roll out bars and plates are precision ground. Our shop has plate bending rolls that will take a steel plate and roll it into a tube and press brakes that take a steel plate and bend it to any angle. Sometimes the plate is hot but more often it is cold. Another machine will shear the plate cold. Plate an inch thick can be sheared cold easier than you would cut a piece of paper with scissors. We have oxy-acetylene torches controlled by an electric eye, and you can cut a 3- or 4-inch steel plate to any desired shape by making the electric eye follow the edge of a sheet of white paper cut out to the same shape as the required steel plate. We have hydraulic and mechanical presses that will turn out work of almost any required shape.

We have ourselves developed Tournaplate bending rolls in two standard types. There is the rugged pyramid type, used mostly for heavy plate, which has one disadvantage in that it will roll only to within about 6 inches of the end of

the plate, leaving that much flat stock on the end to be formed in another machine or cut off. There is also a pinch type that does not possess this disadvantage but is normally only used on thinner plates. Several sizes of a plate bending roll have been built that can be used as a pyramid roll or as a pinch roll. Both ends of a workpiece can be pinched in one pass through this type of machine. All of this production equipment, however, had to be built by machine tools.

A person does not need to be a machinist to enjoy a machine tool show. *The old-fogy thinking that modern machine tools put men out of work is all wrong.* Building more and better machine tools make less labor produce more, but that means that an hour's labor will buy more and the more men that produce, the more they can have. If they work shorter hours, they produce less, and if they work longer hours, they can have more. The individual should be allowed to choose how much he wants.

Preview of the Chicago Shows

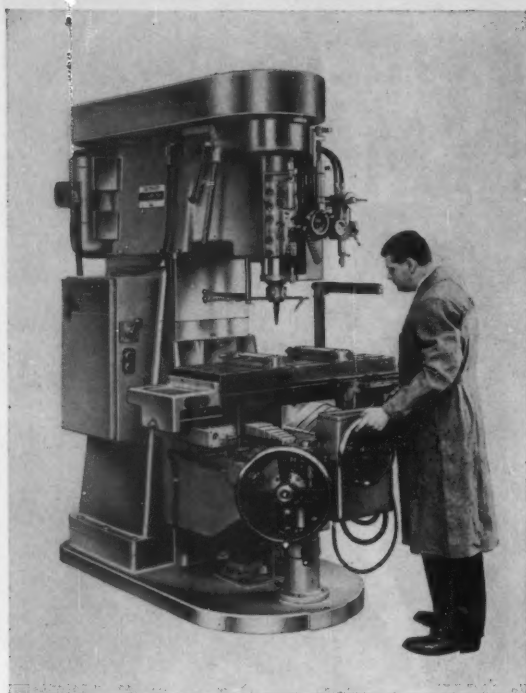
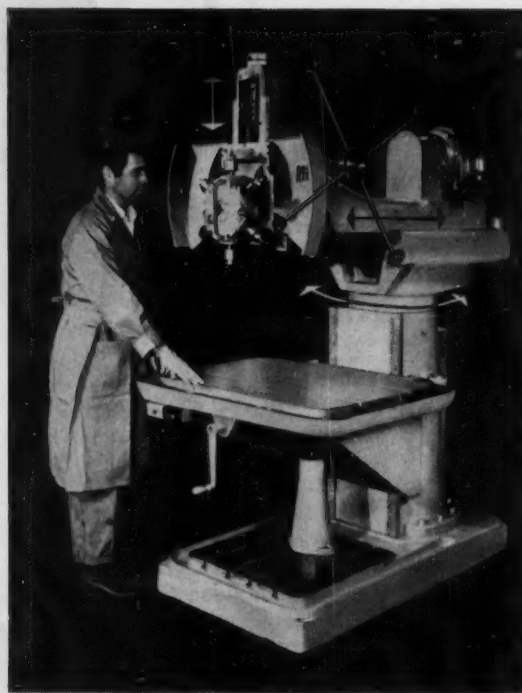


Fig. 9. P & W die-sinker features hydraulic refinements



Radial turret drill announced by the Burg Mfg. Co.

simultaneously set the table longitudinally and the carriage transversely is fifteen seconds. In a more complete application, a punched card or tape will also control spindle approach to hole, cutter speed and feed, and boring depth.

Indicate Item 181 on postcard, page 325

Burgmaster Turret Drills

Coliseum, Booth 716

On-the-spot demonstrations of a new six-spindle, power-indexing radial model will be included in the exhibit of the turret drill line presented by Burg Mfg. Co., Inc.,

Gardena, Calif. The radial turret drill features pre-selective spindle speeds of 225 to 3000 R. P. M.; pre-selective depth control for each spindle; an 8-inch stroke; hydraulic clamping; a 2-H.P. motor; a 3/4-inch drill capacity in steel; a maximum radius of 42 inches and a minimum radius of 15 inches; and a table size of 36 by 24 inches.

Included among the other turret models will be the 2A and 2B six-spindle, power-indexing automatics, and the 2BH six-spindle and eight-spindle automatics.

Indicate Item 182 on postcard, page 325



Sheldon lathe with improved U-type drive having external shifting levers

Sheldon and Sebastian Lathes

Coliseum, Booth 702

The Sheldon Machine Co., Inc., Chicago, Ill., will show its complete line of lathes, millers, and shapers in operation, with special emphasis on carbide turning and production tooling. Two drive units for Sheldon lathes will be exhibited for the first time.

An improved U-type drive arrangement on the recently introduced Model UM-56-P lathe, here illustrated, has external shifting

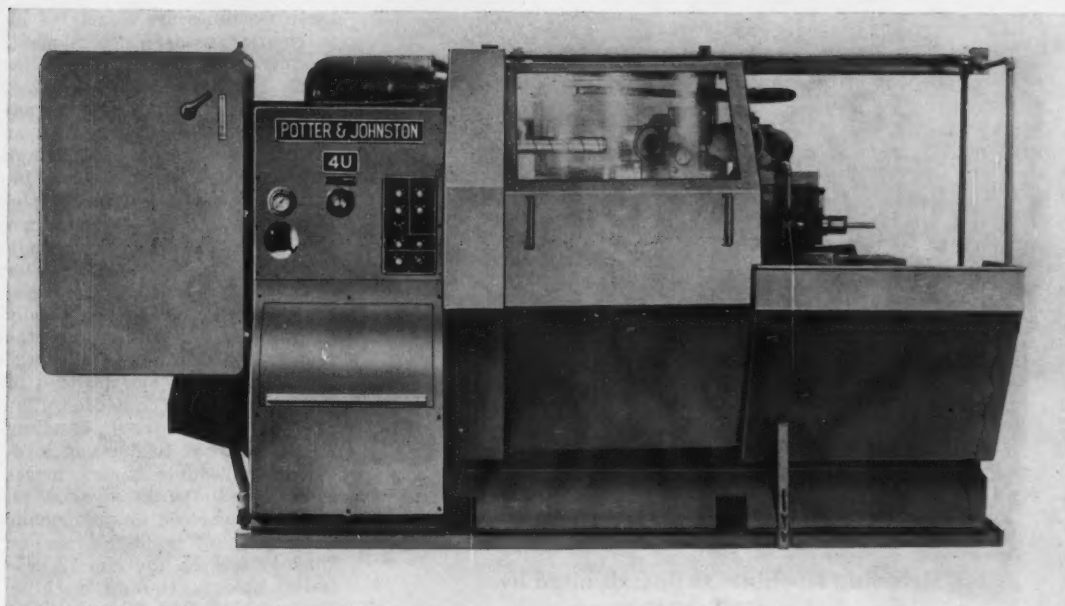


Fig. 1. Potter & Johnston automatic turret lathe with welded steel bed

levers for eight rapid spindle-speed changes. This 13-inch swing lathe has an all V-belt drive, with a range of 50 to 1200 R.P.M. Center distance is 34 inches.

Other new features include a ratchet-action tailstock lock; double Neoprene cog V-belts to the spindle; and a heavy cast-iron pedestal completely enclosing the motor and drive. A new three-drawer, portable, storage cabinet, shown in

the illustration, can be flush-mounted against the tailstock pedestal. A lever-operated variable-speed drive will be demonstrated.

The new Sebastian 13- and 15-inch swing, geared-head lathes incorporate tapered roller spindle bearings, a rapid-shift spindle-speed dial, a one-shot lubrication system, and a lead-screw reverse lever built into the gear box.

Indicate Item 183 on postcard, page 325

Potter & Johnston Turret Lathes

Machine Tool Show, Booth 1219

The Model 4-U automatic turret lathe, Fig. 1, built by Potter & Johnston Co., Pawtucket, R. I., will be in actual operation at the Show. The bed of the machine is a heavy, steel weldment with ample ribbing. To provide maximum accuracy and resistance to wear, bedways are of laminated construction, with bearing surfaces of hardened tool steel.

Chuck sizes are 10, 12, and 15 inches, with motors from 15 to 25 H.P. specified. There are six automatic feed changes, and four automatic speed changes from 45 to 1177 R.P.M. Turret index, traverse, feed, and spindle rotation can be closely timed; all these functions are controlled from a conveniently located drum.

Rapid production of hard-to-machine parts is facilitated on the Model 6-DRE-40 automatic turret lathe shown in Fig. 2. An all-new headstock capable of a 40-H.P. input provides extra power for carbide tools. Chuck sizes are 18, 24, and 30 inches. A wide range of speeds and feeds makes it possible to handle a variety of work and materials. Changes are made by multiple-disc friction clutches controlled electro-pneumatically.

Indicate Item 184 on postcard, page 325

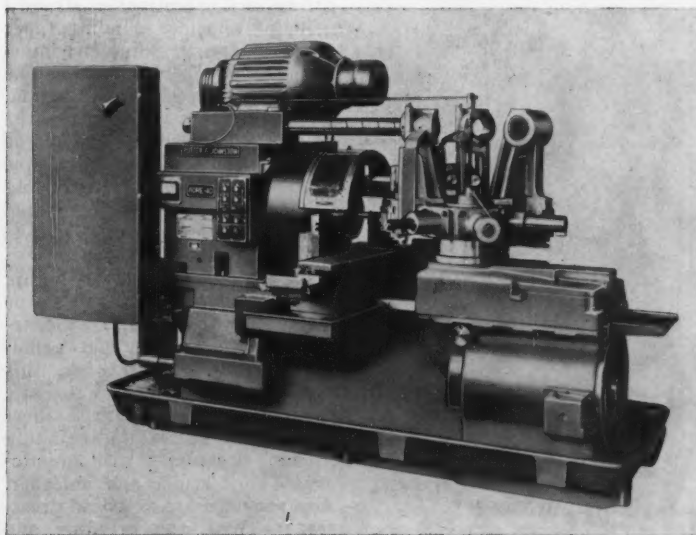


Fig. 2. Large automatic turret lathe completely redesigned for carbide tooling

Preview of the Chicago Shows

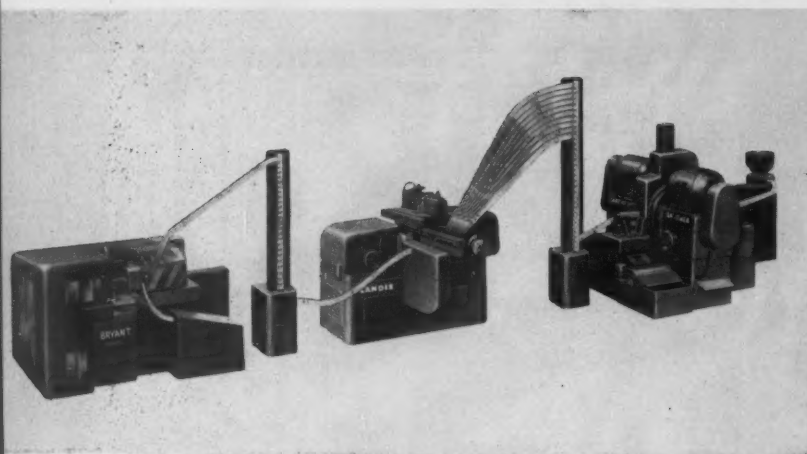


Fig. 1. Automated production line for the rapid production of ball-bearing outer races utilizing Gardner, Landis, and Bryant grinding machines

Grinding Machines to be Exhibited by Landis Tool Co.

Machine Tool Show, Booth 1117

Three machine tool companies, Landis Tool Co., Waynesboro, Pa.; Gardner Machine Co., Beloit, Wis.; and Bryant Chucking Grinder Co., Springfield, Vt., have cooperated in a unique joint venture. They have set up an automated production line employing three different types of grinding machines, seen in Fig. 1, for the precision finishing of ball-bearing outer races.

The parts are automatically

transferred from a vibratory hopper to a Gardner 2H30, 26-inch horizontal double-disc grinding machine where the parallel sides of the rings are ground to size. Following this the periphery of the parts are stack-ground on a Landis No. 12 1/2 centerless grinding machine. Grinding of the internal ball race is done on the third machine, a Bryant 2209-G automatic internal grinder. All

three machines are correlated by automatic transfer equipment. Gaging of the parts is done automatically after each operation.

Automatic loading and unloading have increased the rate at which crankshaft line-bearings can be ground on the Landis 16-by 40-inch, Type H-1W multiple-wheel hydraulic grinder. The machine, Fig. 2, grinds five main bearings and the oil-seal diameter of a V-8 crankshaft in one operation. Each shaft is automatically positioned for grinding and, at the completion of the grinding cycle, is carried to the opposite end of the machine and unloaded. The hydraulically powered handling unit, which has two sets of loading and unloading fingers, moves across a rail type transfer fixture.

Four diameters on automobile universal-joint spiders can be finish-ground on the No. 12 centerless spider grinding machine. The machine, Fig. 3, is equipped with an automatic, hydraulically operated work loader with a magazine type feed and an indexing unit for turning the work-pieces. Multiple wheels are mounted on both the grinding wheel and the regulating wheel spindles for this operation. The average rate of production is 240 work-pieces per hour.

Small tools and parts for the aircraft and instrument industries can be economically ground on the 10- by 20-inch Type H universal grinding machine equipped with a swinging internal grinding fixture. This unit, Fig. 4, will handle such operations as straight grinding, shoulder grinding, taper grinding, face grinding and internal grinding. Work speeds may be varied between 90 and 600 R.P.M. by means of a rheostat on the front of the machine. Two speeds are available with the traverse handwheel, the slower speed being valuable in the tool-room when grinding a shoulder or a radius requiring a fine feed.

High production rates within close limits of accuracy can be obtained on the No. 12 1/2 centerless multiple-diameter shaft grinding machine. The key to this production rate is the automatic operation of the unit. As illustrated in Fig. 5, the grinding machine is equipped with an automatic work loader and unloader. Also provided are overhead dressers for both the grinding and regulating wheels. This arrangement includes profile cams and

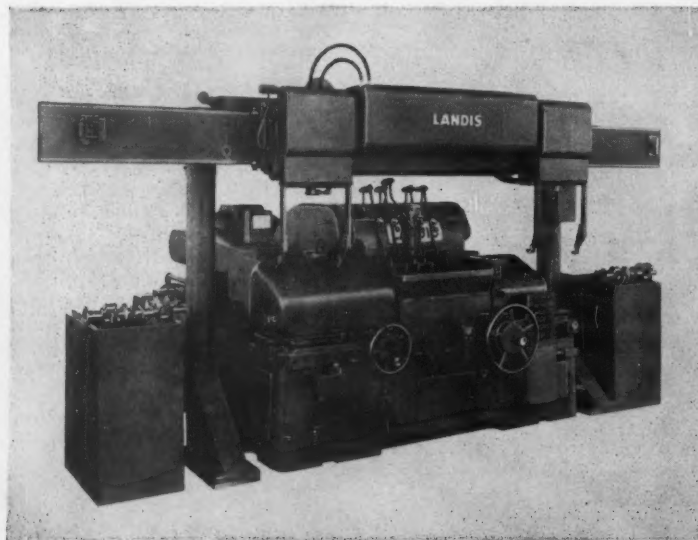


Fig. 2. Automatic 16- by 40-inch multiple-wheel grinding machine to be displayed by Landis Tool Co.

Preview of the Chicago Shows

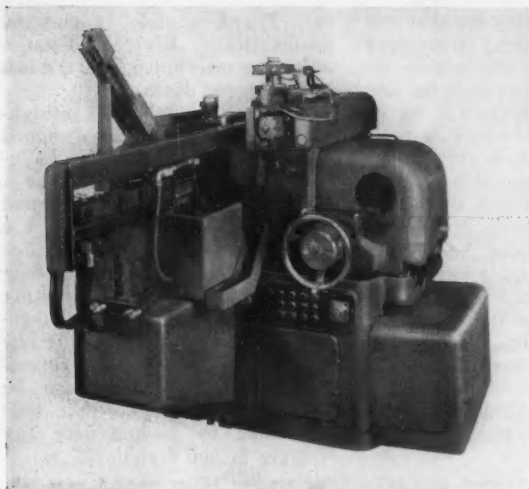


Fig. 3. Centerless No. 12 spider grinding machine to be exhibited by Landis Tool Co.



Fig. 4. Wheel-head may be fed either manually or hydraulically on the Landis grinding machine

cam followers mounted on the dresser slides.

A built-in gaging device coupled with fully automatic handling permits rapid production of bearing races on the 4-inch "Concentric" grinding machine, Fig. 6. Additional features include a hydraulically operated automatic wheel dresser, a counter to control dressing intervals, a dress-pass counter for determining the number of diamond passes over the grinding wheel, and special handwheel feed mechanism and controls to accommodate feed-back signals from a quality-control gaging device.

Among the other new machines

to be exhibited are the 12- by 36-inch Type K universal grinding machine, the 10-inch Type K plain cylindrical grinding machine, and the 6- by 18-inch and the 10- by 36-inch Type K plain cylindrical grinding machines. Included among the improved machines to be displayed are the "Grindwell" general-purpose grinding machine, the 5-inch Type DH semi-automatic hydraulic cam grinding machine, the 12- by 28-inch universal and tool grinding machine, the 4-inch Type H plain hydraulic grinding machine, and the No. 12 centerless grinding machine. Another feature will be

the demonstration of an automated grinding line for the production of valves for internal combustion engines.

Indicate Item 185 on postcard, page 325

Denison Multipress and Hydraulic Equipment

Machine Tool Show, Booth 819

Hydraulic equipment—featuring the Multipress and a varied line of precision-built pumps, motors, and controls—will be displayed by the Denison Engineering Co., Columbus Ohio. Equipment in ac-

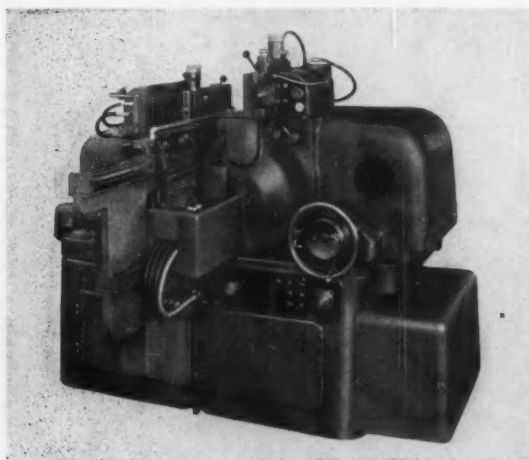


Fig. 5. Landis centerless multiple-diameter shaft grinding machine with work-handling fixture

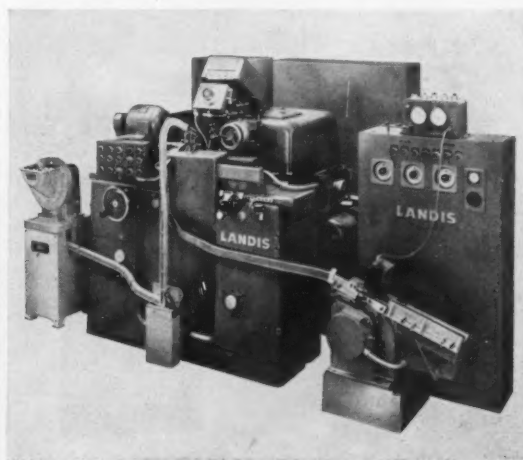


Fig. 6. Fully automatic handling is provided on the Landis automatic "Concentric" grinding machine

Preview of the Chicago Shows

tual operation will include: a 50-ton press with index-table; a 4-ton, D-frame Multipress; an 8-ton, F-frame Multipress with servo control; a 15-ton press with index-table; and a 4-ton stock-feed press. A 4-ton, D-frame press with index-table, and a 4-ton Multipress with automatic controls will also be on exhibit.

The Multipresses will feature manual or automatic control, touch control for applications requiring individual control of ram speed and pressure, vibratory ram action, hydraulic interlock, adjustable speeds, and ram reversal adjustment. On the 50-ton Multipress with six- or twelve-station index-table, ram movement can be regulated from fast approach

to controlled pressing speed at any desired point during downward travel. Hydraulic production accessories can be incorporated and controlled through the valving of the press system to provide positive synchronization of movement and efficiency of operation.

The 8-ton press with servo control provides big press advantages in a floor-saving size. The 15-ton press with index-table has a cam track under the table dial to permit arrangements for automatic raising and ejection of finished parts. The Denison Multipump will also be shown in a simulated production set-up. This product is a variable-volume pump of vane type construction.

Indicate Item 186 on postcard, page 325

cut. The hob slide is clamped pneumatically. A center distance adjusting mechanism sets the hob to the proper depth.

The machine is built for high-speed hobbing. Hobs are designed with a minimum diameter to increase the indexing speed for a given surface speed. Index and feed change-gear mountings are fixed. However, to compensate for small changes in lead, which may be required due to heat-treating distortion, a tangent-bar arrangement is attached to the feed-screw nut to provide for such corrections. The hob swivel can be rotated 45 degrees either side of center to accommodate any changes in hob design.

Indicate Item 187 on postcard, page 325

Barber-Colman Introduces Vertical Hobbing Machine

Machine Tool Show, Booth 1322

The Barber-Colman Co., Rockford, Ill., is introducing a No. 3-6 vertical hobbing machine specifically designed for automatic loading and gaging of parts which are mass-produced. Built for continuous operation rather than general-purpose work, the machine, here shown, has wide application for hobbing speedometer and transmission gears, starter pinions, appliance gears and drive gears up to 3-inch diameter by 6-inch face width and 10 diametral pitch.

This machine can be equipped with many types and varieties of

tooling, loading, and gaging devices. It has a vibratory hopper-loading device and a gaging mechanism that segregates gears of the correct size from those not within the required tolerance. If a predetermined percentage of gears are out of tolerance, the machine can be set to stop automatically.

An automatic hob shifter is part of the cycling mechanism and can be set to shift a certain amount after each cycle, or it can be arranged to shift after a certain number of parts have been

Kling to Unveil New Machines

Coliseum, Booth 453

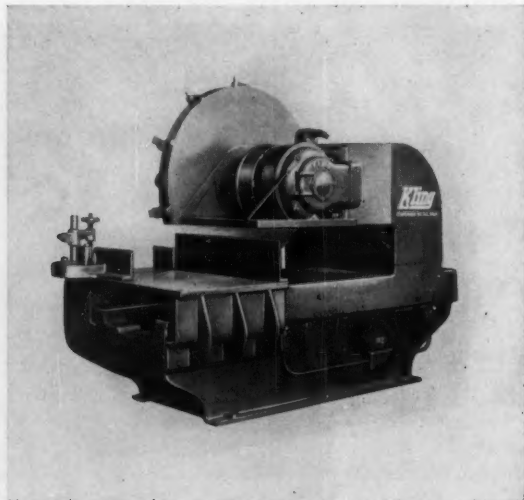
Kling Brothers Engineering Works, Chicago, Ill., will unveil an entirely new line of metal-working machines, the construction and operation details of which have not been revealed.

The high-speed friction saw shown here will be on display. This machine is designed for fast cutting of steel shapes. A semi-automatic control is provided for regulating the speed of the carriage to suit the cutting requirements of different materials and types of work.

Indicate Item 188 on postcard, page 325



Barber-Colman vertical hobbing machine



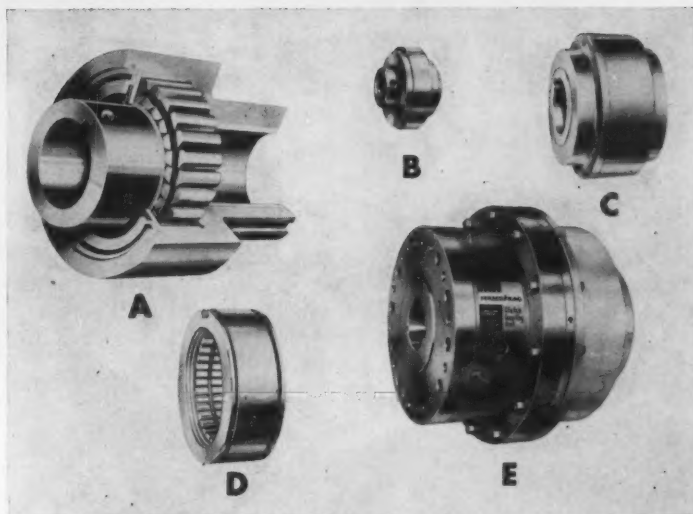
Kling machine to be unveiled at Coliseum

Preview of the Chicago Shows

Formsprag Over-Running Clutches

Navy Pier, Booth 432

A complete line of full-complement over-running clutches will be exhibited by the Formsprag Co., Van Dyke, Mich. Shown for the first time will be three new series of clutches and a clutch coupling unit that have been made possible by a simple basic construction shown at A. The clutch at B meets an increasing demand for a small clutch having a high torque capacity, long life, and requiring a minimum of maintenance. A large-bore clutch C was designed for backstopping applications requiring large bore sizes. The Series 50 clutch D was developed for applications where adequate inner-race concentricity is provided. It is particularly useful where the backstop can be incorporated into a bearing bore, and an existing shaft extension serves as an inner race. For applications requiring an over-running feature



Formsprag clutches with basic construction shown at (A)

when coupling two shafts, the clutch-coupling unit shown at E has been developed.

Indicate Item 189 on postcard, page 325

compound angular drilling operations. Features include an automatic, pre-selected speed-shifting mechanism controlled from the pendant station, and reduced overall size of the machine without reduction of capacity or working area.

The machine can be used for both portable and stationary applications. Electric column-clamping power traverse, at 80 inches per minute and electrical positioning control of machine movements and swivels facilitate handling.

Kaukauna Radial Drill, and Drilling and Boring Machine

Machine Tool Show, Booth 1210

Kaukauna Machine Corporation, Kaukauna, Wis., will exhibit a compact, universal radial drilling machine, Fig. 1. A swiveling, com-

pound headstock increases this machine's versatility for conventional radial drilling operations, as well as horizontal, angular, and

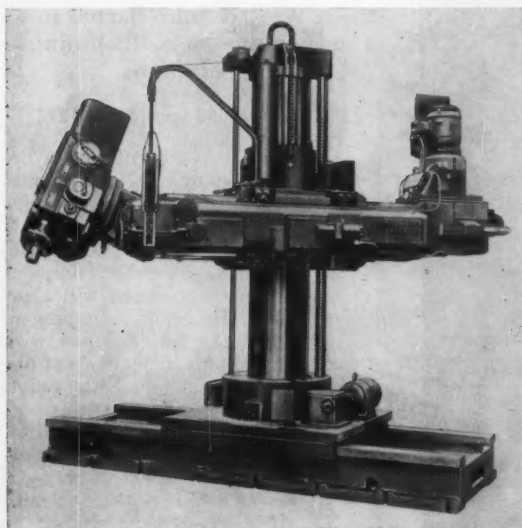


Fig. 1. Kaukauna universal, radial drilling machine features a swiveling compound headstock



Fig. 2. Horizontal drilling and boring machine is equipped for automatic speed and feed selection

Show Previews



The Proficorder gives a record of the true magnified profile of a surface

The machine has a built-in lifting bail, and spreader-arm supports on the base.

Also to be displayed will be a horizontal drilling and boring machine, Fig. 2. Features include automatic speed and feed selection, controlled by a single, rotary-

action, direct-reading dial on the headstock. Dual-speed traverse mechanisms for the headstock and the column enable the spindle to be positioned quickly and accurately. A centralized, push-button panel controls all movements.

Indicate Item 190 on postcard, page 325

"Electro-Graphic" detector system developed by W. F. & John Barnes Co., to reduce electrical maintenance costs



Micrometrical Proficorder

Navy Pier, Booth 651

The Proficorder, a stylus type tracing instrument which provides a true magnified profile of a surface on a permanent chart, will be shown by the Micrometrical Development Corporation, Ann Arbor, Mich. The instrument, here illustrated, consists of three basic parts: a tracer, a Pilotor, and an Amplicorder.

A differential transformer type transducer, the tracer has a diamond tracing stylus of very small tip radius which is moved parallel to surface being studied. Vertical displacements of the stylus produced by surface irregularities modulate a carrier voltage which is fed into the Amplicorder.

The Pilotor holds the tracer and the part to be studied, and provides the tracing motion parallel to the part. Adjustments can be made for leveling the reference plane so it is parallel to the surface of the part. The length of the tracing stroke can be set from 1/16 to 1 1/2 inches.

A carrier oscillator, amplifier, and recording meter are the elements of the Amplicorder. By means of a selector switch on the amplifier vertical magnifications from 500 to 10,000X can be obtained. A gear shift on the chart drive provides horizontal magnifications from 5 to 500X.

Indicate Item 191 on postcard, page 325

W. F. & John Barnes to Feature Mass-Machining Methods

Machine Tool Show, Booth 1223

The latest developments in design applied to the complete machining of automobile cylinder heads will be featured by W. F. & John Barnes Co., Rockford, Ill. A scale model of a complete plant lay-out and equipment will show how skillful planning of a production line may be combined with modern, automatic methods of machining to effect substantial reductions in plant operating costs.

Other portions of the exhibit will feature a five-station operating section of a twenty-six-station, "Progress-Thru" transfer type machine developed to handle certain automobile cylinder head operations. This unit will be

Show Previews

a full-size machine completely equipped with the latest in electrical controls and hydraulic circuits. The electrical controls will feature the "Electro-Graphic" maintenance detector system, seen in the accompanying illustration, which makes possible up to a 90 per cent reduction in electrical maintenance costs.

Indicate Item 192 on postcard, page 325

Fox Introduces Drilling and Tapping Machine

Machine Tool Show, Booth 419

The Fox Engineering Co., Jackson, Mich., will present its new Model E-60-HT vertical, multiple-spindle, hydraulic-feed drilling and lead-screw feed tapping machine. This unit, here illustrated, has a 12- by 24-inch adjustable spindle head which is equipped with sixteen spindle pinions for 1 3/8-inch universal joints. Spindle speeds over a range from 202 to 990 R.P.M. are changed by pick-off gears located in an accessible case on top of the head. The head and slide of the machine are counterbalanced hydraulically.

Both the drilling and tapping cycles are automatic, initiated when the "cycle start" button is pressed. Up to 12 inches of drill-

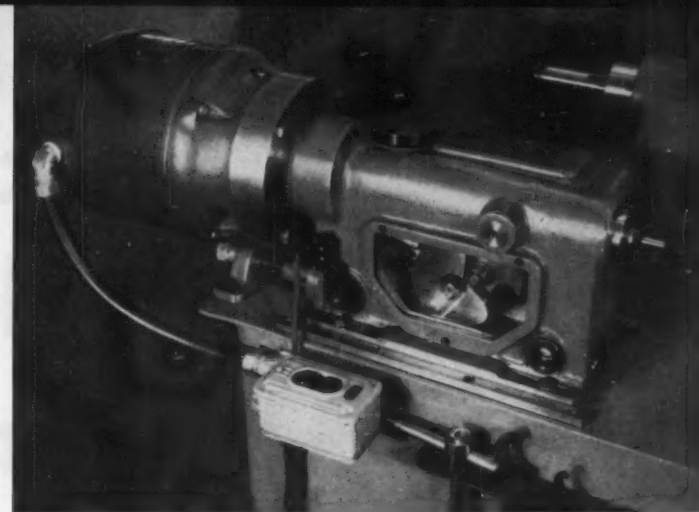


Fig. 1. Zagar cam-feed drill self-contained unit available in four sizes ranging up to 5 H.P.

ing stroke is available while a tapping stroke of 14 inches is possible since the tapping spindles accommodate up to a 2-inch stroke. Rapid advance and return rates of the cycle are 158 and 183 inches per minute respectively. Drilling feed, infinitely variable within the limits of two ranges, is 0.7 to 18 inches per minute in the coarse-feed range and 0.5 to 6 inches per minute in the fine-feed range. Thrust at 1000 pounds per square inch is 5.7 tons. The machine complies with current J.I.C. standards.

Indicate Item 193 on postcard, page 325

Zagar Cam-Feed Drill Units

Coliseum, Booth 461

New items on display by Zagar Tool, Inc., Cleveland, Ohio, will be self-contained cam-feed drill units and an air-and-oil-feed drill press. One of the drill units appears in Fig. 1. Four sizes, up to 5-H.P. capacity, are being built to perform drilling, reaming, tapping, and milling operations. All are cam-controlled and completely mechanical in performance. Stand-

(Continued on page 270)

Multiple spindle drilling and tapping machine introduced by Fox Engineering Co.

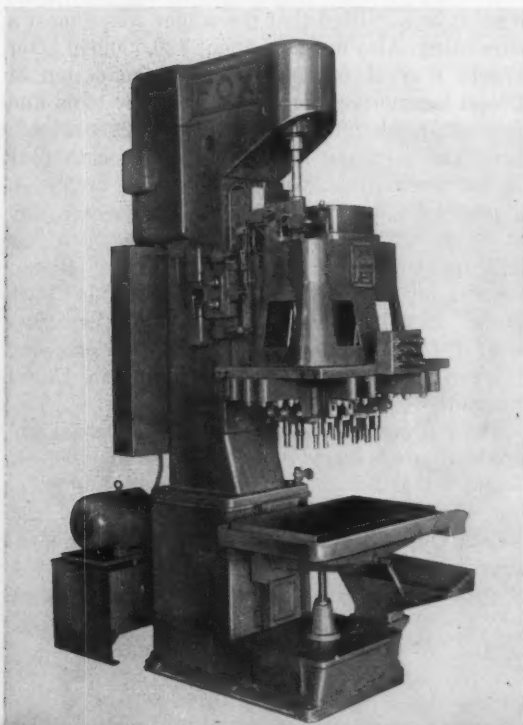
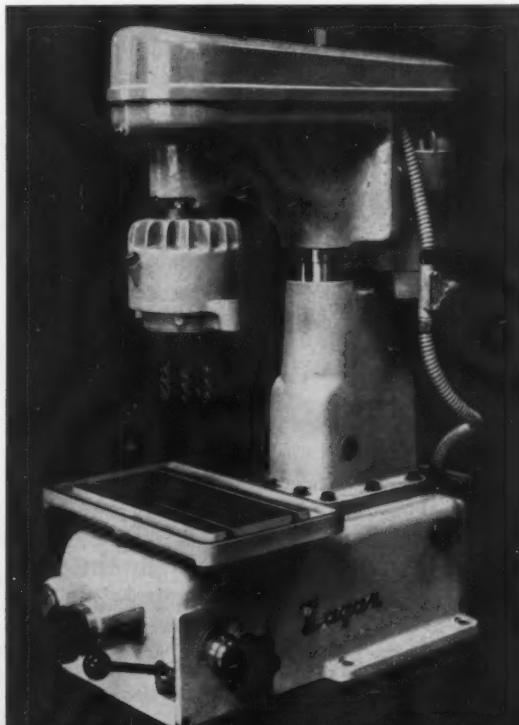



Fig. 2. Air-actuated drill press which features a hydraulic power-feed





Machine Tool Modernization Programs

By D. W. CAMERON

Vice-President, Manufacturing
Alco Products, Inc.

DEVISING and following an effective machine tool modernization program, while still observing the requirement for stable profit margins, is a problem which industrial manufacturers know is steadily becoming more complicated. It is an accepted truism that one of the surest roads to disaster is to be so obsessed with profits that depreciation allowances are too low, with the inevitable result that production facilities soon are outpaced by competition. On the other hand, it is, of course, quite possible to be so concerned with plant modernization programs that normal profits are postponed beyond a reasonable expectation point.

Like most other questions of business management, this involves primarily the quality of judgment. A sound measurement of the market potential for each product, a reasonably accurate prediction of the percentage of the market which can be obtained, and a good estimate of the operating profit margin on such production, are basic among the factors which must be considered in arriving at a decision as to the cost allowance for machine tool investment.

It is no trick at all to have the most modern plant in the world from the standpoint of the latest in machine tool equipment . . . assuming, of course, ample cash for investment and a willingness to invest it in production facilities. The objective, however, is to so time that investment in new tooling as to coincide with a market uptrend

in the products to be produced. Machine tool manufacturers and industrial equipment fabricators are united in the fervent wish that more accurate predictions of such timing could be available. That kind of "forecaster" could practically name his price tag—and get it!

Alco Products, Inc. (formerly the American Locomotive Co.) does have one significant success story in such timing prediction—although it must be admitted that the wager was almost a sure thing. Alco invested about \$20,000,000 after World War II for high volume production of Diesel locomotives, primarily for new tools and special production facilities. That bet paid off, since the company has produced three to four Diesel locomotives per working day and even a peak of five and one-half locomotives a day at times. That is better than \$1,000,000 a day in shipments of this one product alone. It had taken a long time, however, to reach this "sure thing." Alco had produced the nation's first successful Diesel locomotive in 1924—twenty-one years before the big postwar bulge in Diesel locomotive orders occurred.

The relationship between market potential and production efficiency is as old as business itself—and it frequently involves the proverbial question of which comes first, the chicken or the egg. No one can safely say for sure, because the situation must change for the industry, for the type of product, and for the market. Retooling often

will lower product prices, with consequent healthy effects upon market potential.

Alco decided, for example, back in 1930, in the depths of the depression, to enter the heat exchanger business. The company had an excess capacity for locomotive production and felt a requirement to diversify into new industrial markets. It had had some experience in heat transfer through production of steam locomotive boilers and related equipment, and it had worlds of experience in metal fabrication. The market wasn't there at the moment in sufficient quantity to justify a substantial investment, so the tooling up program was quite modest. The market soon did broaden, fortunately, and with it came a continuing investment over the years in the tooling required to make Alco one of the largest heat exchanger manufacturers in the world.

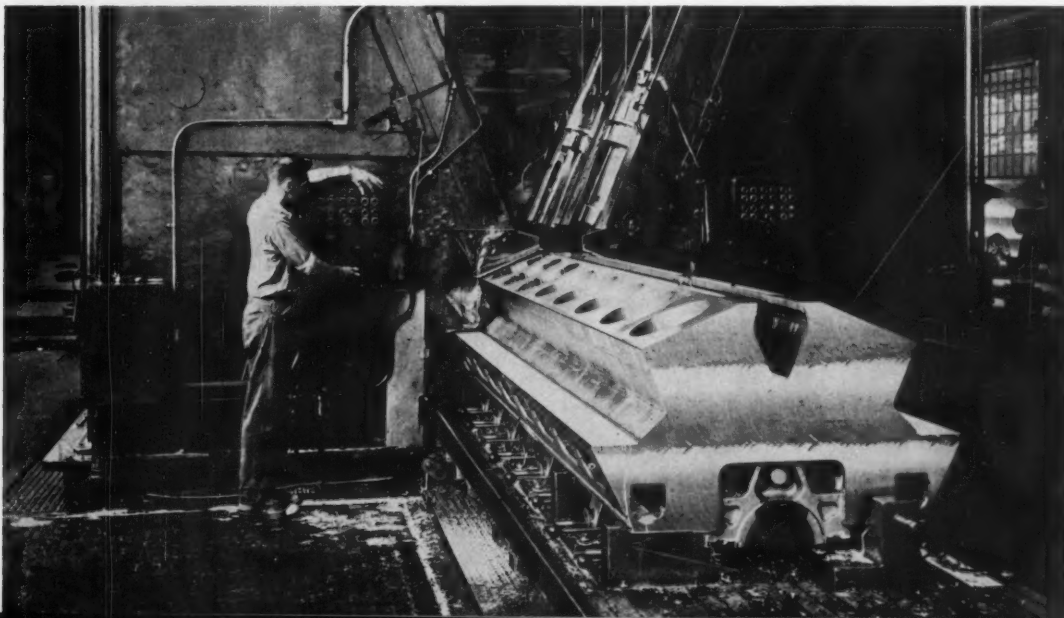
Two-thirds of all heat exchangers used in synthetic rubber plants in World War II were of Alco design and most were Alco-built. Our heat exchangers are in the USS Nautilus and in atomic energy production plants. Moreover, the thermal engineering experience acquired was responsible in part for a contract to build the nation's first package reactor plant.

Machine tool investment today is so complicated, however, that it extends far beyond the expected areas involved in purchasing decisions. The price put on a product often is a reflection of proximity to raw materials and to customer locations, labor rates, delivery demands of customers, traffic advantages, and many other very real and sometimes conflicting necessities. It may be that some of these considerations may tend to offset advantages of tooling modernizations. On the other hand, a good and continuing program of constant review of production efficiencies may

be the life blood of a company which is at a price disadvantage because of location or high wage costs. It goes without saying, perhaps, that a company which has location advantages and a progressive retooling program, too, should do very well indeed. Arriving at qualitative cost decisions in tooling modernization today demands the best in management talent.

Alco Products, Inc. has a machine tool investment in excess of \$50,000,000 and it is sure to rise at a rapid pace in the future. Our dependence upon the machine tool industry is increasing with an aggressive program to find new products and new markets which fit into a carefully planned expansion effort. There is not a single one of our six plants which has not had important new machine tool facilities added within the last year.

We have practically completed a new shop at our Dunkirk plant which will be the most modern in the world for semi-automatic production of large-diameter water, sewage and dredge pipe. New turbine blading tools have been installed at our Auburn plant, together with other precision machinery for the production of Diesel engine components. Tooling for straight-line production of springs, with automatic coiling machines and conveyorized heat-treating has cut costs at Latrobe, Pa. Modern furnaces and tooling will increase output of prefabricated pipe in a Cincinnati plant recently acquired. Specially designed machine tools for production of fintube exchangers—another newly purchased product line—have been moved to the Beaumont, Tex., plant. The large Schenectady plant has a relatively rapid machine tool modernization program, and we are now in the process of retooling for one complete product line there.



Preview of the Chicago Shows

ard equipment includes four cams and a set of cycle change gears. Four drives are available—cone-pulley, direct-motor, stub-shaft, and gear transmission.

Each unit can accommodate drills from 3/8 to 2 inches in diameter. Spindle speeds range from 300 to 4032 R.P.M. The stroke can be set from a minimum of 2 3/8 inches to 5 inches.

The drill press, shown in Fig. 2, is air-actuated, and features a hydraulic power-feed. It is designed for multiple-spindle operations. Also to be exhibited in the company's booth are gearless, multiple-spindle drill heads; drill fixtures; a horizontal broaching machine; and collet tools.

Indicate Item 194 on postcard, page 325

General Electric Control Transformers

Navy Pier, Booth 107

The Specialty Transformer Department, General Electric Co., Schenectady, N. Y., will display smaller, lighter, Class B control transformers in standardized sizes. New materials, including Alkanex wire, and a unique method of frame size design are major factors in a weight and size reduction of up to 40 per cent. All-welded construction is used.

Within each frame size, which is related to volt-ampere capacity, a wide variety of voltage combinations is available with no change in over-all and mounting dimensions. The units are available in dual frequency (50/60



Class B control transformer of all welded construction announced by General Electric Co.

cycle) and series-multiple ratings. The initial eleven transformer frame sizes available include ratings from 25 through 2000 volt-amperes for conduit wiring, and 25 through 250 volt-amperes for open wiring.

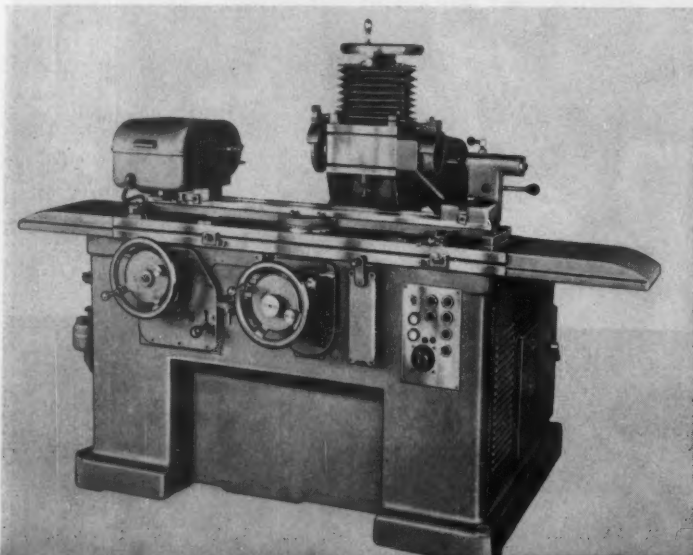
Indicate Item 195 on postcard, page 325

Covel to Exhibit New Grinders

Machine Tool Show, Booth 720

One feature of the display by Covel Mfg. Co., Benton Harbor, Mich., will be a new No. 32 universal and tool grinder, Fig. 1. This grinding machine will swing work

Fig. 1. No. 32 universal and tool grinder to be shown by Covel Mfg. Co.



12 inches in diameter by 30 inches between headstock and tailstock. Headstock speeds are electronically controlled and infinitely variable from 50 to 400 R.P.M., and table speeds, from 0 to 144 inches per minute. Fine transverse and longitudinal feeds are provided for circular form-tool work.

Also of completely new design will be a No. 12A universal cutter and tool grinder having a Pope tilting head with 1-H.P., direct motor-driven spindle. Operating controls are conveniently located at both front and rear of the machine. Cross-feed and elevating screws have precision ground threads, and the machine has ball-bearing table ways.

Another new unit to be exhibited will be a No. 14 optical comparator, Fig. 2. All measurements are taken by direct readings from carbide-tipped dial indicators, and the 14-inch diameter screen is said to give halo-free images. Working area is 13 by 6 inches, horizontal movement 6 inches, and vertical



Fig. 2. Portable optical comparator has a 14-inch diameter screen

movement 2 1/4 inches. A 25X lens is standard equipment.

Other machines to be displayed include a No. 6 universal cutter and tool grinder; a No. 35 and a No. 60 horizontal, hydraulic feed, reciprocating table surface grinder; a No. 10 mechanical power and hand-feed surface grinder; and a No. 7 hand-feed surface grinder.

Indicate Item 196 on postcard, page 325

Show Previews

Niagara Presses, Shears, and Press Brakes

Machine Tool Show, Booth 715

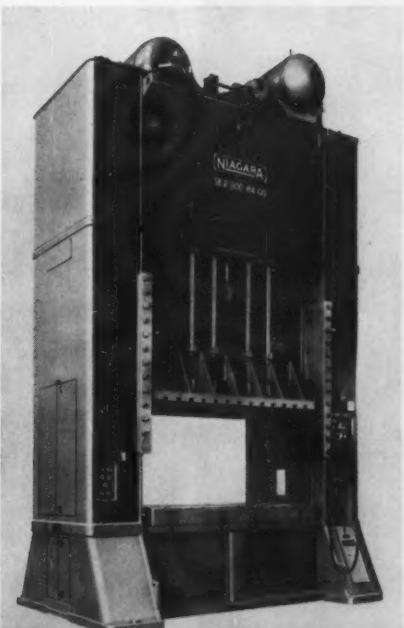
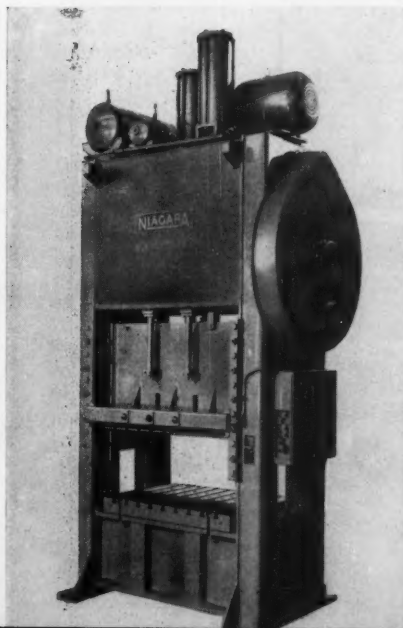
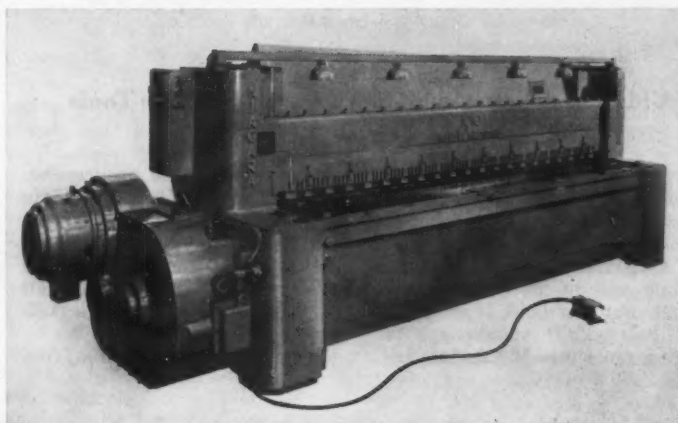
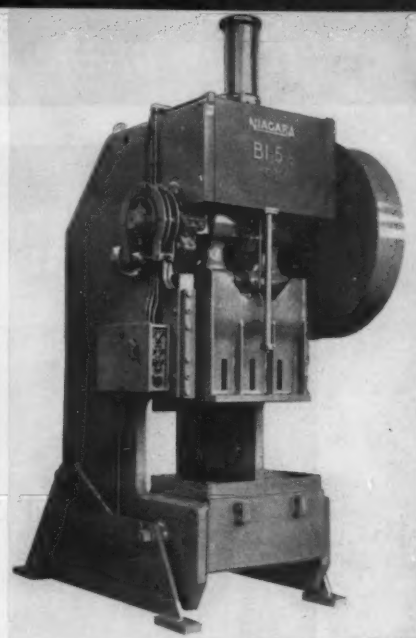
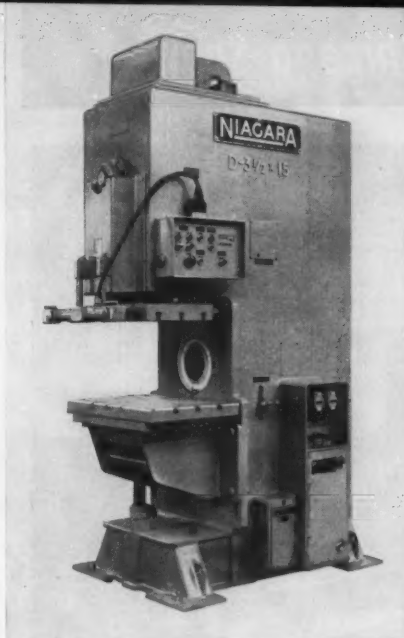
Innovations in presses, press brakes, and shears will be featured by the Niagara Machine & Tool Works, Buffalo, N. Y. For example, one of the presses to be exhibited in action will be the No. 3 1/2 adjustable-bed press seen at the left in the top row. This press will have a front-to-back mounted crankshaft, and will be equipped with tooling to perform operations in an automation line. Another press to be exhibited is the open-back 150-ton inclinable seen at the right in the top row.

A Niagara underdrive, power squaring shear that will be displayed is shown at the right center. The straight-side, double-crank press illustrated at the left in the bottom row has two-point suspension and is rated at 200 tons.

A straight-side, eccentric-gear press is seen at the center in the bottom row. This press has two-point suspension and is rated at 300 tons capacity. Left-to-right dimension of the bed is 84 inches, and front-to-back, 60-inches.

The 75-ton inclinable press shown at the right in the bottom row will feature a front-to-back mounted crankshaft. This press will also be equipped with automation tooling. Other equipment to be displayed will include press brakes and bending rolls.

Indicate Item 197 on postcard, page 325



Preview of the Chicago Shows

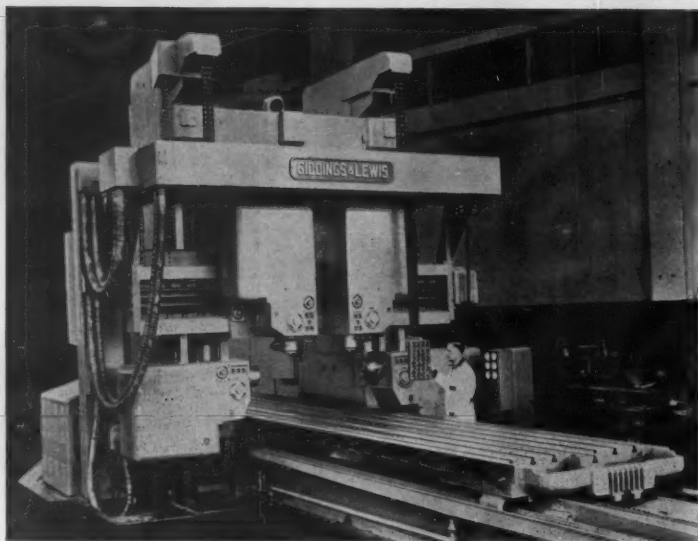


Fig. 1. Large planer-miller, with four 10-inch diameter quills, to be exhibited by Giddings & Lewis Machine Tool Co.

Giddings & Lewis to Show Variety of Machine Tools

Machine Tool Show, Booth 710

Designed expressly for fast metal removal, the planer-miller shown in Fig. 1 will be exhibited by Giddings & Lewis Machine Tool Co., Fond du Lac, Wis. Each of four milling heads, having a 10-inch diameter quill, is provided with twenty-four spindle speeds ranging from 9 to 500 R.P.M. ar-

ranged in geometric progression. An individual 50-H.P., 1800-R.P.M., water-cooled motor powers each head. The table drive permits the use of either climb or conventional milling, while a new jaw-clamp holds the table in position for cross milling.

Five push-buttons and a feed

selector dial are located on each head. All auxiliary functions of the machine are controlled from a fixed panel at the right-hand side, and all operating functions are controlled from a portable, power actuated pendant station. A feed-reel system encloses all electrical, hydraulic, and cooling facilities. Safety interlocks are provided for all machine units and functions, including the water-coolant supply to the heads. Units that can be brought together, such as the milling heads, are also provided with safety controls to prevent collision.

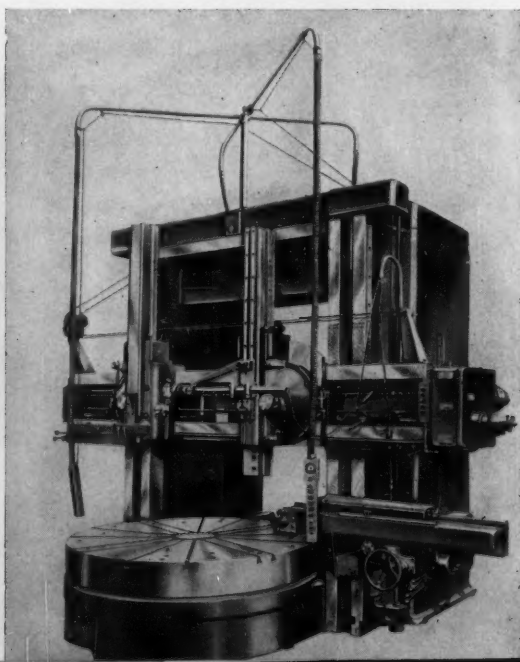
Cutting cast iron and steel at the rate of 400 feet per minute will be demonstrated on the Hypro double-housing planer, Fig. 2. The machine has a 48-foot long bed, a 22-foot long table, and 49 1/2 inches between housings. Features of this planer include dual saddle and slide controls, power cross-feed for the side-heads, an electric rail clamp, twin helical-gear table drive, pneumatic tool lifters for both rail and side-heads, and hydraulic table stops and jacks. Also featured is a special high-horsepower, adjustable-voltage motor drive with table speeds ranging from 25 to 400 feet per minute.

A new 8-foot Hypro, heavy-duty, vertical boring and turning mill features specially designed box type housings and a new bed and table unit designed to support loads up to 55 tons. A large ta-

Fig. 2. Hypro double-housing planer which will be shown cutting steel at the rate of 400 feet per minute.



Fig. 3. Hypro vertical boring and turning mill features a 55-ton capacity table and two-dimensional tracer control



Preview of the Chicago Shows

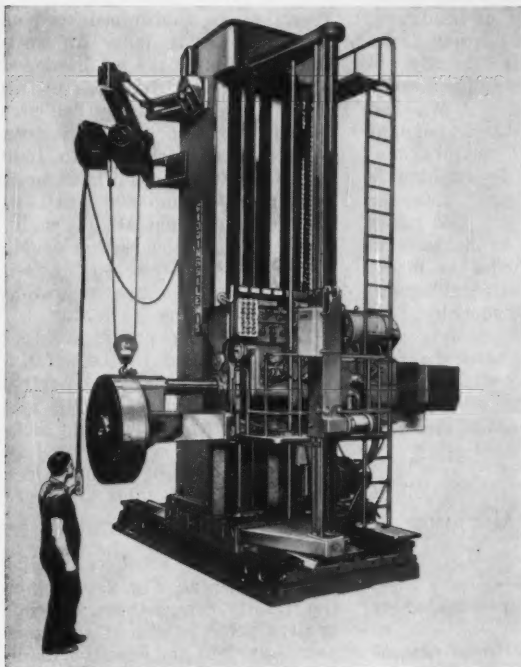


Fig. 4. Floor type, precision horizontal boring, drilling and milling machine has an underarm tool support and an attached power hoist.

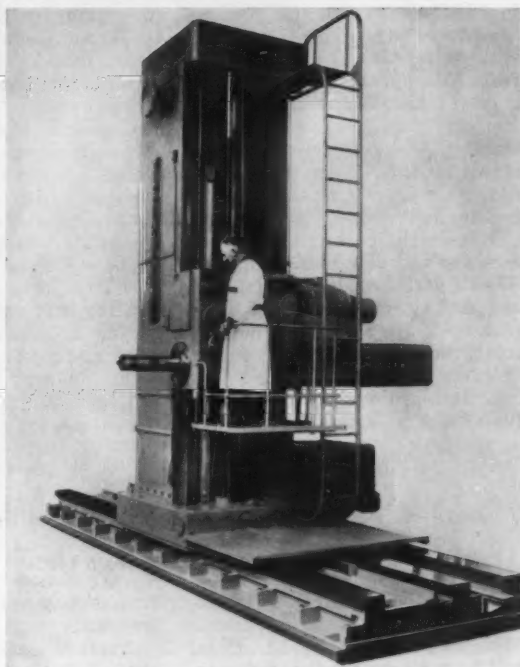


Fig. 5. Giddings & Lewis floor type, precision horizontal boring, drilling, and milling machine equipped with a 6-inch diameter spindle

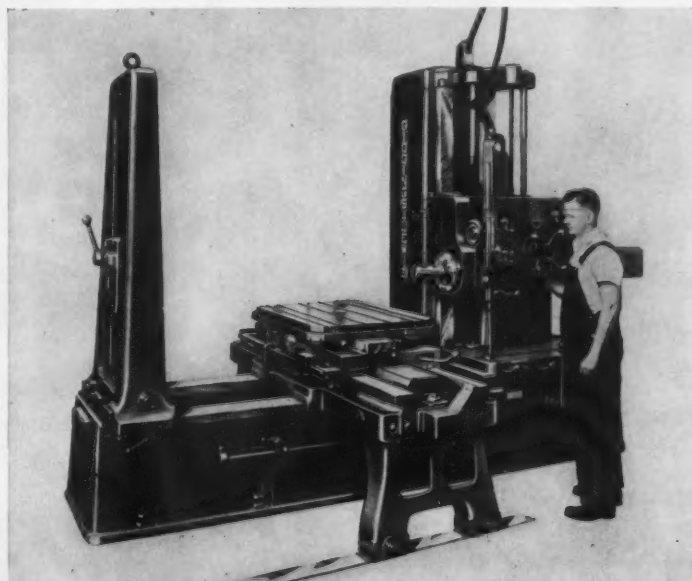
pered roller bearing at the center of the table prevents misalignment of either table or work due to radial thrust. The machine, Fig. 3, has a speed range of 0.7 to 60 R.P.M., and features an electronically controlled duplicator that provides two-dimensional tracing. Incorporated in the boring and turning mill, is a constant surface speed attachment as well as a constant chip thickness control.

Several design innovations have been incorporated in the Model 570-FUAR floor type, precision horizontal boring, drilling, and milling machine shown in Fig. 4. Of primary importance is a built-in underarm which adds to the capacity of the machine insofar as the mounting of accessory tooling is concerned. The underarm is a rectangular, precision-finished member—14 inches wide by 12 inches high—which can be extended parallel to the main 7-inch spindle, and is power fed. Another innovation is a built-in elevator for the operator. This unit functions either simultaneously with, or independently of, the machine headstock. Tool-changing time is minimized by an attached power hoist for handling heavy accessory attachments.

Also to be demonstrated is an intermediate-size, floor type, precision horizontal boring, drilling, and milling machine, Fig. 5. The first of a new 40 Series design, this machine employs a 30-H.P. reversing type motor on the headstock for direct drive to the spindle. Separate motors are used for feeding the headstock along the

column, and the column along the runway. Selection of various spindle movements, which may be altered without stopping the spindle, is accomplished by means of push-buttons and dials through hydraulically actuated clutches and "electro-hydraulic" units. This Model 460-FUAR also has an optional built-in underarm support for use

Fig. 6. Small horizontal boring, drilling, and milling machine features a 30- by 36-inch built-in rotary table



Preview of the Chicago Shows

in conjunction with the machine headstock. The spindle is provided with thirty-two speeds, ranging from 3 to 800 R.P.M., which are divided into four different ranges. Each of the four ranges has eighteen feed selections. Low and high limits of the four feed ranges are 0.500 and 120 inches per minute.

The smallest machine in the company's display will be the No. 300-RT horizontal boring, drilling, and milling machine, Fig. 6. It features a 30- by 36-inch built-in rotary table for fast and accurate indexing on difficult work setups. Included among the design features of this machine are: in-

dependent operation of headstock, table, and saddle in either direction; individual directionally operated controls; spindle-speed range of 7 to 1600 R.P.M.; and an electric push-button pendant for safe, convenient control of machine functions. The machine is equipped with a 3-inch diameter spindle, a 72-inch bed, and has a headstock travel of 48 inches. Also to be exhibited will be the model 350-T table type horizontal boring, drilling, and milling machine, featuring a lubrication cooling system; and a 42-inch vertical turret lathe featuring "joy stick" control of feed and traverse movements.

Indicate Item 198 on postcard, page 325

Precision is guaranteed to plus or minus 0.0001 inch. An anti-friction quill, made of hardened Nitralloy steel, is mounted in two sets of races containing 900 pre-loaded precision balls. Sixteen spindle speeds from 30 to 1800 R.P.M. are provided, and eight feeds ranging from 0.0005 to 0.010 inch per revolution. Dial selectors at the push-button station enable the operator to pre-select the feed and speed for the next operation while the machine is running.

Leveling screws provide a three-point support for the bed of the jig borer, to maintain perfect alignment. Ways are of vee and flat design. Non-influencing locking clamps are provided to lock the table and saddle in place after positioning. Two table sizes are available, 22 by 44 inches and 22 by 54 inches.

The Fosdick sensitive, radial drilling machine, Fig. 2, combines the rigidity, compactness, and convenient table height of the company's upright and sensitive drilling machines with the capacity and flexibility of radial machines. The fixed-height arm and adjustable-height table can both be swung 360 degrees. Nine speeds ranging from 60 to 1200 R.P.M., or from 175 to 3500 R.P.M.,

Fosdick Jig Grinder, Jig Borer, and Drilling Machines

Machine Tool Show, Booth 1402

Among the machines to be exhibited by the Fosdick Machine Tool Co., Cincinnati, 23, Ohio, will be a Moore-Fosdick automatic-positioning, jig-grinding machine. This machine makes it possible to automatically position the work within plus or minus 0.0001 inch, and to precision-grind cylindrical and tapered holes, as

well as any contour—regular or irregular.

Another machine to be demonstrated is the jig borer, Fig. 1, which combines direct-dimension measuring with automatic positioning. Dimensions are set right from blueprints to direct-reading drum dials, one each for longitudinal and transverse measurement.

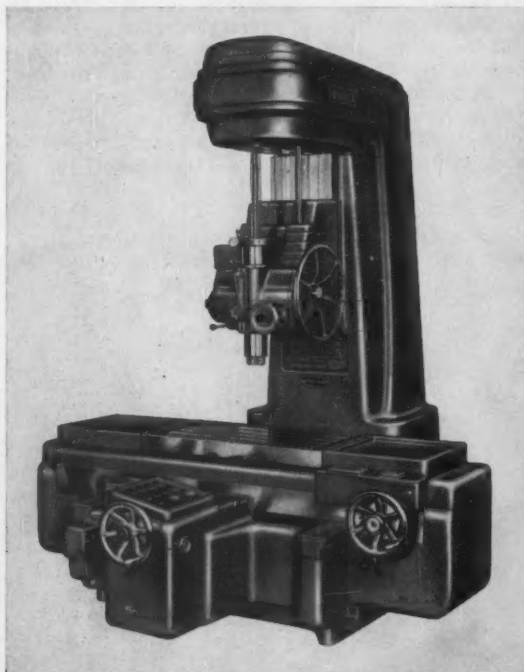


Fig. 1. Fosdick jig borer combines direct dimension measuring with automatic positioning

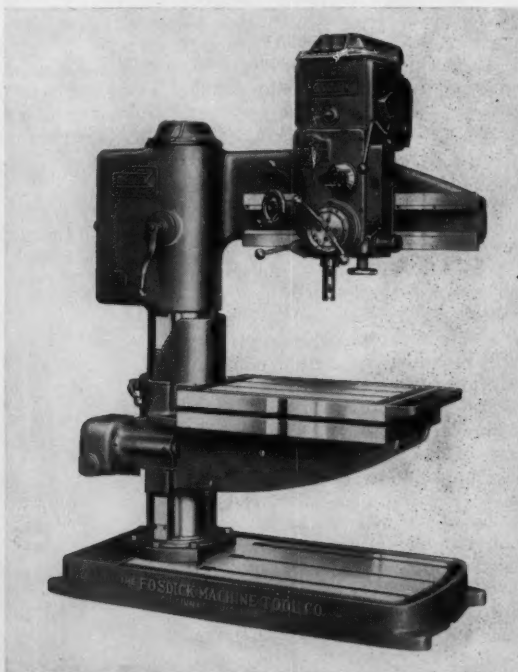


Fig. 2. Sensitive radial drill with 12-inch diameter column has 3- or 4-foot long arms

Show Previews

are controlled by a direct-reading lever, and four feeds varying from 0.004 to 0.020 inch, or from 0.002 to 0.010 inch, are available.

A Fosmatic radial drilling machine, Fig. 3, features pre-selected feeds and speeds, and thirty-six spindle speed choices up to 3000 R.P.M. Speeds and feeds are selected on dials, and shifting is accomplished by raising the spindle control lever slightly in its neutral position. Feed is engaged through a magnetic clutch, and disengaged either by depth control or pushing a button on either quick-return lever.

Spindle and quill of the Fosmatic machine have been made heavier than on previous models, and a new arm design is claimed to be twice as strong. Other features include hydraulic column and arm clamps, combined arm-elevating and head-traverse lever, hydraulically variable rapid traverse, and tool ejector. The machines are built with 4- to 8-foot arms, and 13- to 19-inch columns.

The sensitive, radial drill, layout machine, Fig. 4, combines a jig borer table with a radial drilling machine. A screw equipped with a graduated dial, moves the table accurately across the knee, and an outboard support connects the end of the arm with the base for rigidity. The 24- by 42-inch table has a movement in and out of 18 inches, and maximum distance from the spindle to the top of the table is 23 inches.

To use the lay-out machine as a radial drill, the outboard support can be removed easily, and the work mounted on the adjustable table. If desired, the filler block between the end of the arm and the outboard support can be removed, and, in this case, the support remains in position and the arm is allowed to swing free. Speed and feed ranges are the same as for the radial drill previously described and illustrated in Fig. 2.

Also to be shown are three sensitive drilling machines—two single-spindle machines of 1 1/2 and 3 H.P., and one four-spindle machine having 1 1/2 H.P. per spindle. These machines are available with six or nine spindle speeds, and features include adjustable head on column, reversing motor control for tapping, direct-reading speed levers, and table elevating lever in front.

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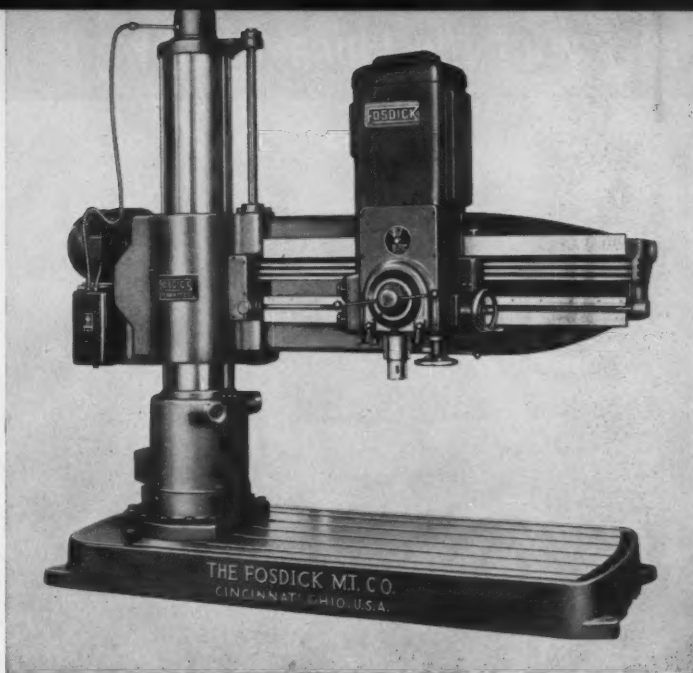


Fig. 3. Fosmatic radial drilling machine featuring thirty-six spindle speed choices up to 3000 R.P.M.

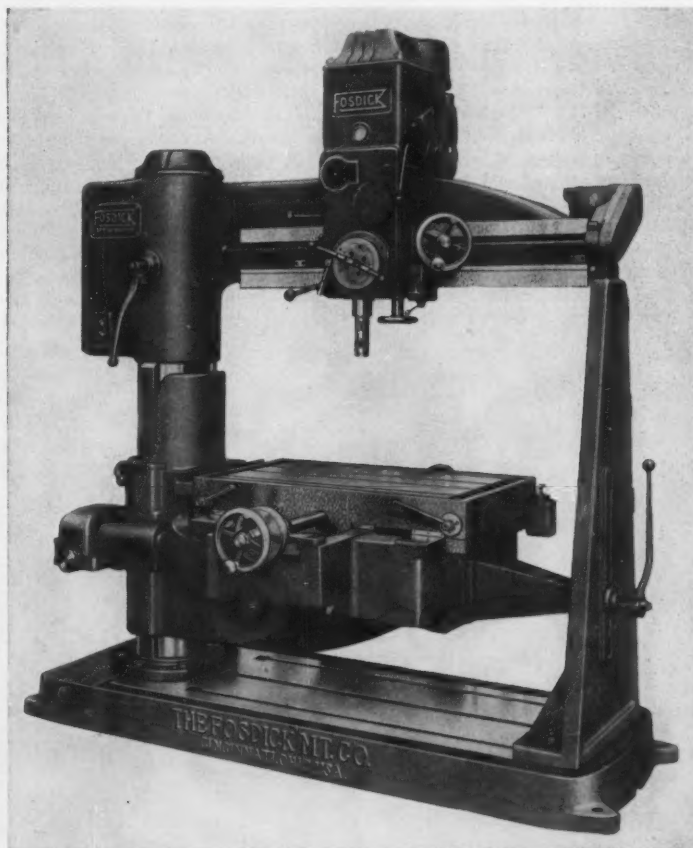


Fig. 4. Radial drilling machine that has been equipped with a jig borer table for use as lay-out machine

Preview of the Chicago Shows

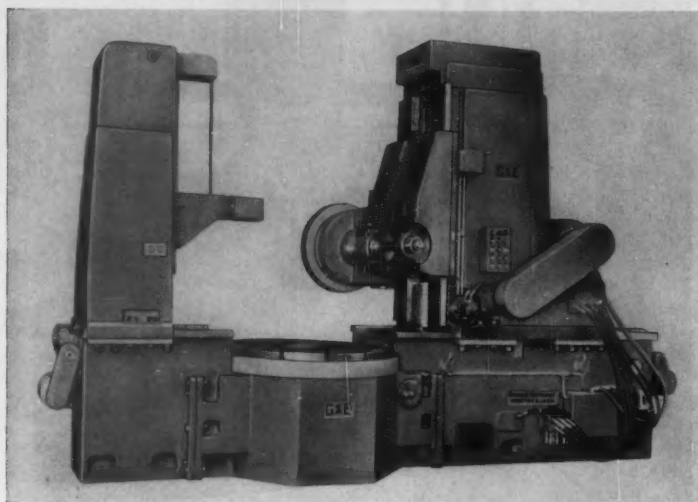


Fig. 1. Gould & Eberhardt disc type gear-cutting machine for spur gears

Gear-Cutting Machines and Shaper by Gould & Eberhardt

Machine Tool Show, Booth 1424

One of a series of disc type gear-cutting machines for large-diameter and coarse-pitch spur gears will be shown for the first time by Gould & Eberhardt, Inc., Irvington, N. J. This 72S machine, Fig. 1, operates on the vertical cutting principle and has an adjustable stanchion to accommodate various diameter gears and depths of cut. An automatic cutting cycle consists of three interlocked phases: cutter feed, rapid cutter return, and hydraulic work

indexing for each tooth. A hydraulic compensating mechanism relieves the load of the worktable, fixture, and the gear blank during indexing, then is released automatically during cutting.

In addition to conventional down feed, the machine is equipped with up feed for climb cutting. An infinite range of feeds is available from zero to 15 inches per minute. Rated at 1 diametral pitch in steel, the unit will accommodate gears up to 90 inches

in diameter with the work-mandrel support retracted, and 50 inches in diameter with the support in place. Face capacity is 30 inches. The indexing range is from 12 to 400 teeth. An attachment for cutting internal spur gears is available.

Two new high-speed universal gear-hobbing machines for cutting spur gears, single- and double-helical gears, spline shafts, and sprockets, will be exhibited. On the 24H machine, hobbing speeds range from 90 to 550 R.P.M.; while on the 48H machine, Fig. 2, the hobbing speeds range from 65 to 400 R.P.M. These speeds permit operation with high-speed steel hobs at surface speeds of approximately 300 feet per minute. Featured on the machine is an automatic cutting cycle called a "Quadricycle" which consists of a rapid infeed followed by the desired hobbing feed. The hobbing feed is so arranged that either climb or conventional milling can be used.

A new high-speed "HoBlique" helical gear-hobbing machine, Fig. 3, will also be on display. The outstanding feature of this unit is the feeding of the hob—tangent to the helix of the gear being cut—with either of two available basic cutting arrangements. One arrangement uses a "TriLineal" feeding cycle which provides three feed rates in series, two successive fast infeds at different rates followed by the hobbing feed. The other arrangement uses a Quadricycle feed, having a fast infeed followed by the hobbing feed. Intended for the mass production of gears, this machine is adaptable for a wide range of right- and left-hand helical gears with helix angles up to 45 degrees. Hob speeds up to 550 R.P.M. are available. Machine capacity includes gears from 2 3/4 to 10 inches in diameter—8 to 14 normal diametral pitch—with a maximum face measurement of 6 inches.

Many design improvements such as a solid-top ram, hard-chrome plated ram V-ways, and an electric clutch and brake are featured in a new line of shapers, one being shown in Fig. 4. The ram slot has been eliminated, and the ram reinforced with both a longitudinal rib and heavier cross-ribbing. For more convenient operation, a separate and positive ram lock has been brought forward, adjacent to the ram positioner. A multiple-disc

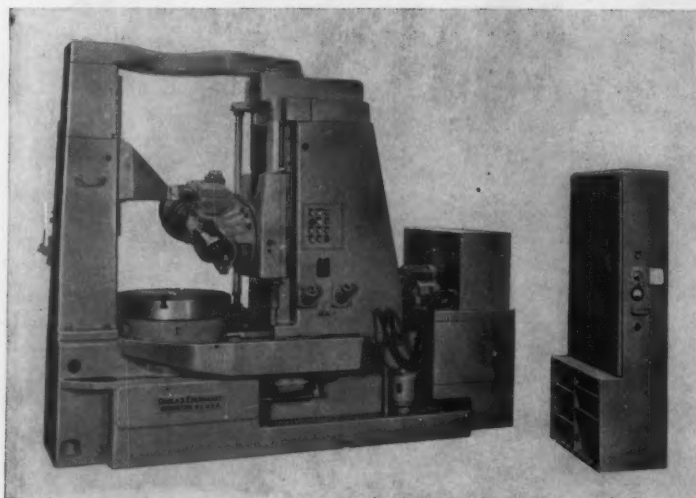


Fig. 2. High-speed universal gear-hobbing machine for spur gears and single- and double-helical gears

Preview of the Chicago Shows

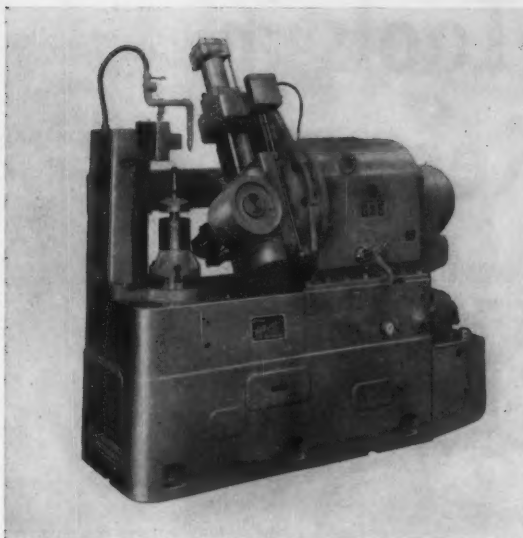


Fig. 3. "HoBlique" hobbing machine for the mass production of helical gears

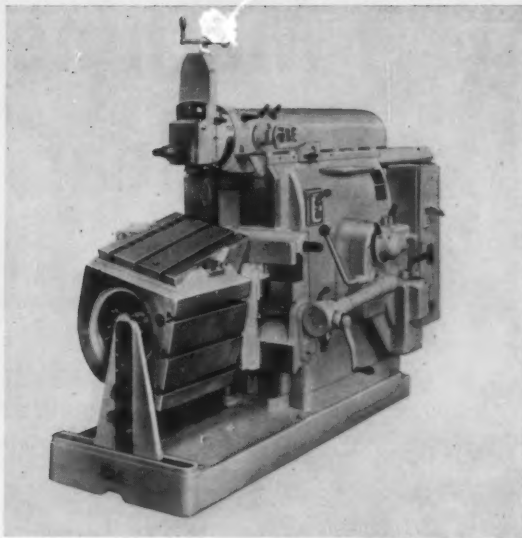


Fig. 4. Newly designed shaper to be exhibited by Gould & Eberhardt, Inc.

electric clutch and brake, with single finger-tip control, provide positive starting and stopping. This feature is available as optional equipment in place of the

conventional mechanical clutch and brake. A simple rheostat adjustment, to vary the braking severity, is available if needed.

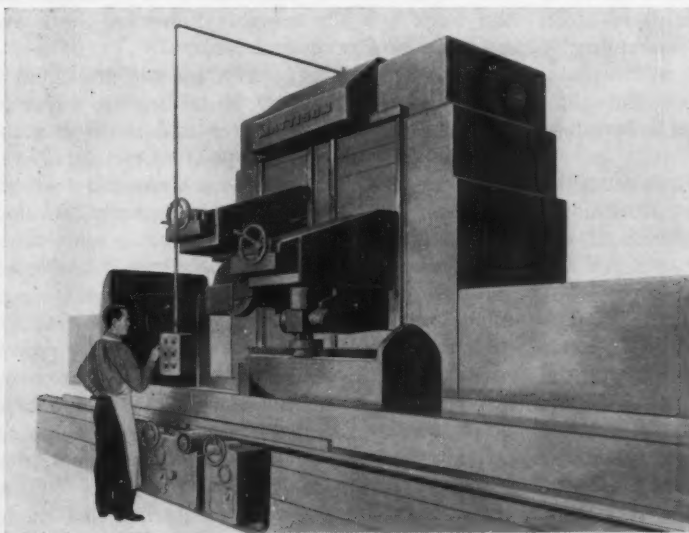
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Mattison Combination Way and Surface Grinder

Machine Tool Show, Booth 1422

A combination way and surface grinding machine featuring independent vertical and horizontal

spindle slides will be demonstrated by the Mattison Machine Works, Rockford, Ill. The machine was



Mattison combination way and surface grinder having independent vertical and horizontal spindle slides

designed to meet specific problems faced by machine tool builders in precision grinding large bed castings, columns, tables, slides, and similar parts without the need for rehandling the work. The independent spindles permit holding two or more surfaces in exact relative alignment.

This machine can be furnished with one vertical and one horizontal spindle, two vertical spindles, or two horizontal spindles, depending upon requirements. Also, one spindle may be completely withdrawn from the operational area during machining, and the vertical spindle can be swiveled 45 degrees forward or back. Centralized control of all machine motions is obtained from a movable pendant. Two-speed power traverse is provided for rapid positioning, with a handwheel to make final fine adjustments.

The vertical spindle of the machine is equipped with a hydraulic wheel dresser which is adjustable from 30 to 60 degrees. Lubrication of the machine is fully automatic, with a centralized lubricating system for oil. Ways of the machine are belt covered. The hydraulic system has been isolated at the back of the machine. The combination way and surface grinder will be manufactured in a range of sizes from 30 inches wide by 30 inches high by 8 feet long, to 42 by 48 inches and 24 feet long.

Indicate Item 201 on postcard, page 325

Machine Tools in Nuclear Research

By JOHN T. BOBBITT,
Assistant Laboratory Director

and

HERBERT V. ROSS,
Superintendent of Shops
Argonne National Laboratory

EACH new stage in the industrial progress of our civilization was made possible by the development of machine tools. The commercial steam engine, generation of tremendous amounts of electric power, and the mass production of machinery and vehicles are only a few examples of industrial advances which would not have been possible without the progressiveness of the machine tool industry.

The controlled release and utilization of nuclear energy is the latest technological achievement attainable because of metal-working tools. Present nuclear reactors were built with the aid of machine tools normally found throughout industry. Many components of these reactors presented no particular problems in their fabrication even though widespread use is made of non-corrosive metals such as stainless steel, Monel, and Inconel. However, the machining of certain metals used in reactors such as uranium, thorium, zirconium, beryllium, and plutonium introduced special problems that had to be solved with standard machine tools.

Uranium is a very tough and abrasive metal, highly pyrophoric, and has extreme work-hardening properties. Under some conditions, it has minor health hazards. Thorium has much the same characteristics. Zirconium, like magnesium, involves fire hazards in its fabrication. Beryllium, a brittle metal, although relatively easy to machine, has been found to involve a substantial health hazard. Plutonium is one of the most toxic substances known to man and, in addition, must be handled under special controls to avoid the possibility of accumulating a critical mass and the resulting major radiation hazard.

Early in the nuclear program the Argonne shops discovered that modern heavy-duty machines were necessary to obtain the rigidity and

strength essential to the satisfactory machining of uranium. Moreover, power in excess of normal industrial requirements is often needed on a machine since heavy feed rates are necessary with uranium parts. A power hacksaw originally equipped with a 2-H.P. motor failed to perform satisfactorily but excellent performance was achieved when a 5-H.P. motor was substituted.

Since great quantities of coolant are required in machining uranium, it is desirable to provide larger coolant reservoirs, pumps of greater capacity, and more adequate splash guards than are ordinarily found on machine tools of the sizes used. Ventilation hoods must be provided to protect the operator of a machine working on beryllium. Ingenious arrangements have been devised to enclose either the entire machine or the work being processed; however, these arrangements slow production.

Tooling machines at Argonne has presented a continuous challenge. Metallurgists, always striving to obtain stronger and more durable materials for reactor use, produce metals, alloys, and ceramics that stress machines and tools to their maximum. The shops normally develop means to work these materials, but in some cases must report back to the metallurgist the need for improved machinability of newly developed alloys in order to permit economical fabrication.

To match tooling more closely with the power used in working uranium, tool bits that are over size for the normal capacity of the machine have been found desirable. Experience in machining large quantities of stainless steel along with uranium, uranium alloys, zirconium alloys, ceramics, and many other materials has led to somewhat novel practices. When new alloys prove to be difficult to machine, a normal tendency is to reduce the feed or speed. However, at



Herbert V. Ross



John T. Bobbitt

Argonne it has been found that improved machining very often results when the feed or speed is radically increased.

It would be difficult to fabricate a nuclear reactor without application of the welding processes. Conditions involving special alloys, extremely corrosive fluids, unusual requirements for gas tightness, and structural strength under irradiation, have all made special demands. Satisfactory solutions have been provided by adaptation of standard welding equipment and techniques. Some difficulty has been encountered, however, in obtaining precise controls.

Extrusion of reactor components will probably be of increasing importance in the future for experience has shown that excellent results can be obtained in the extruding and deep drawing of uranium alloys and zirconium alloys. One of the major problems in the initial construction of reactors was solved when it was found that aluminum cans deep-drawn on a power press could be used to protect uranium fuel elements from oxidation.

The major deviation from normal machining practice lies in the handling of radioactive and toxic materials such as plutonium and irradiated uranium. It is necessary to process plutonium in tightly closed hoods and to exercise great care in its handling outside of the hood. Irradiated materials must be worked behind massive radiation shields provided with special devices for viewing.

Major developments have been made, but many more are necessary in the fabrication of "hot" materials. Costwise the problem is acute because practically all jobs at this stage of development

in the reactor industry are relatively small. As yet there are not enough reactors or fuel elements of one design to require long, continuous production runs that would justify the application of automatic machinery and electronic controls.

As industry's role in the atomic age expands, increasing demands will be made upon machine tool builders. On the other hand, there will be continued need for extremely rugged and rigid machines of standard types capable of machining the tough high-temperature materials necessary for efficient industrial power reactors. Included in this expanding field will be vacuum casting furnaces, rolling mills, extrusion presses, and precision casting equipment. These machines will be needed for the production of reactor components made of expensive and scarce materials.

Special machines will undoubtedly be used when reactor technology has stabilized so that large scale production of standard components will be possible. Some of the problems, particularly in connection with fuel elements, will be difficult to solve. Consider the melting, casting, rolling, machining, and welding of parts made from materials with fire, toxicity and other hazards, along with a level of radioactivity that demands work to be performed behind heavy concrete walls. Residues collect on some equipment making it unapproachable after use; therefore, adjustments and repairs must be made remotely. Volume production will require complex machines able to operate and repair themselves.

This, in our opinion, is the real challenge that the nuclear power industry will present to the machine tool industry.

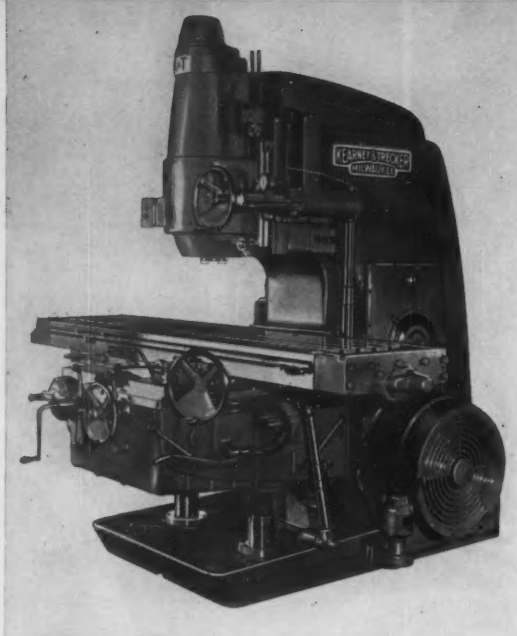


Fig. 1. A Kearney & Trecker heavy-duty, vertical, knee type milling machine

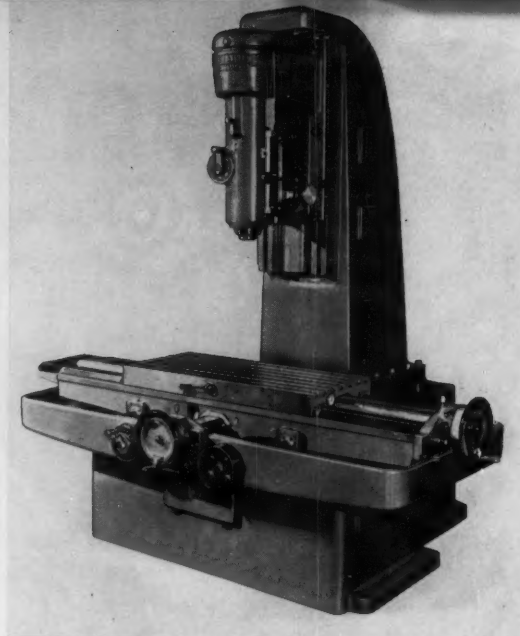


Fig. 2. No. 4 vertical, precision boring machine has dual screws for precise measuring

Kearney & Trecker Milling, Precision Boring, and Special Machines

Machine Tool Show, Booth 508

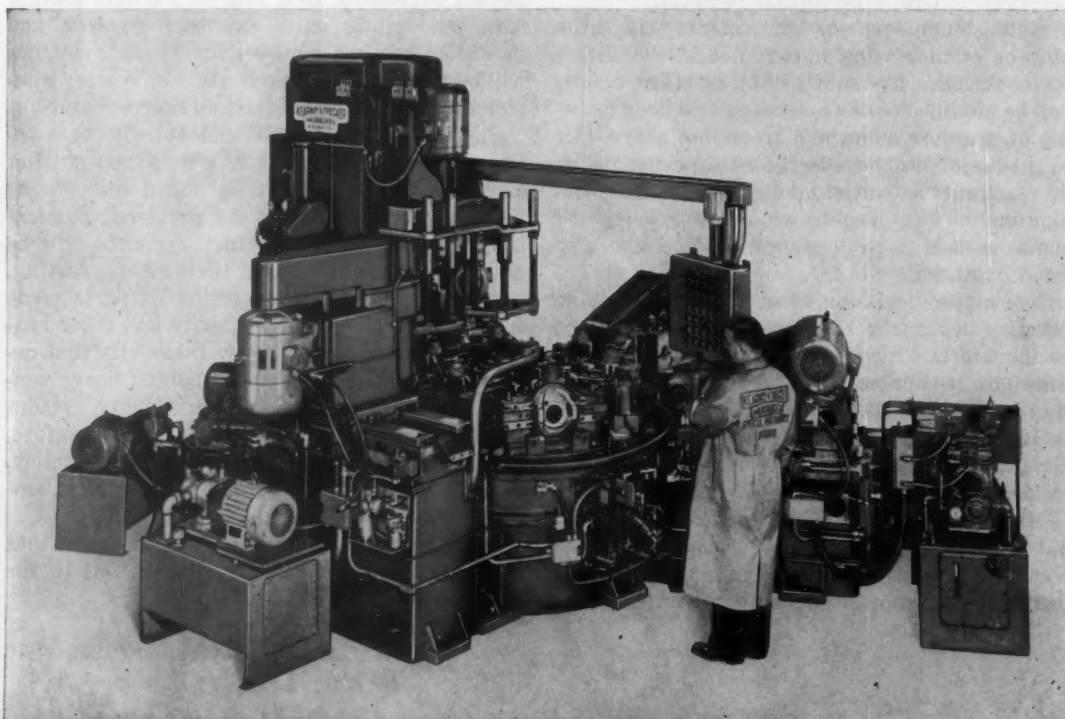
Of thirty-one units to be exhibited by Kearney & Trecker Corporation, Milwaukee, Wis., twenty will be completely new machine tools designed and built within the past twelve months and to be displayed for the first

time. A line of massive, heavy-duty, knee type milling machines will be offered in plain and vertical styles only. A vertical machine is seen in Fig. 1. These machines will be available in four sizes, the No. 3 with a 20-

H.P. motor, No. 4 with a 30-H.P. motor, and Nos. 5 and 6, 50-H.P. motors. The line, designated as the TK Series, includes among many features, the introduction of twin screws for knee movement and support. The screws are precision ground, and are totally enclosed within telescopic tubes, lubricated by a positive and continuous oil flow.

Other features are a simplified control center at the front of the

Fig. 3. Five-station rotary indexing machine for automotive rear-axle differential carriers



Preview of the Chicago Shows

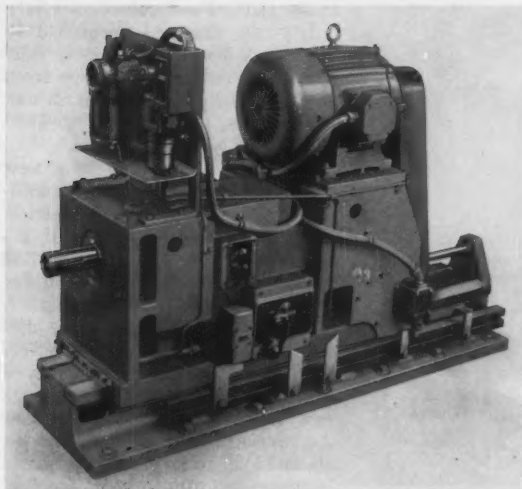


Fig. 4. Standard way type drilling unit has a feed rate range of 1 to 16 inches per minute



Fig. 5. Compudex mechanical indexing computer can index to as low as 10 minutes of arc

machine, including a large hand-wheel for longitudinal movement of the table, and an all-steel table having greater width, which makes possible four T-slots. Also, the knee is considerably larger, wider, and heavier, and has greater bearing for the saddle. The column is both broader and heavier, and has square, wrap-around ways. Provisions have been made for hydraulically locking spindle speed and reverse controls while the spindle is in motion. Broad feed selection is offered in 32 changes from 3/8 to 90 inches a minute. Spindle speeds offer 24 changes from 13 to 1300 R.P.M.

Increased operating accuracy and capacity are highlights of the Autometric line of vertical precision boring machines, now available for the first time in both No. 3 and No. 4 sizes. The No. 4 size is illustrated in Fig. 2. Both machines feature precision measuring by the use of dual screws for both the saddle and the table. One screw in each case is used for drive while the second is used solely for precise measuring. When the operator has positioned the saddle or table, or both, to within thousandths of an inch, he turns a small knob to bring them exactly to zero. A dial indicator graduated in ten-thousandths of an inch facilitates this operation.

The Autometrics have an adjustable sliding head which is counter-balanced and has 10 inches of vertical travel, with 11 inches of quill adjustment to provide increased range. A larger table increases the

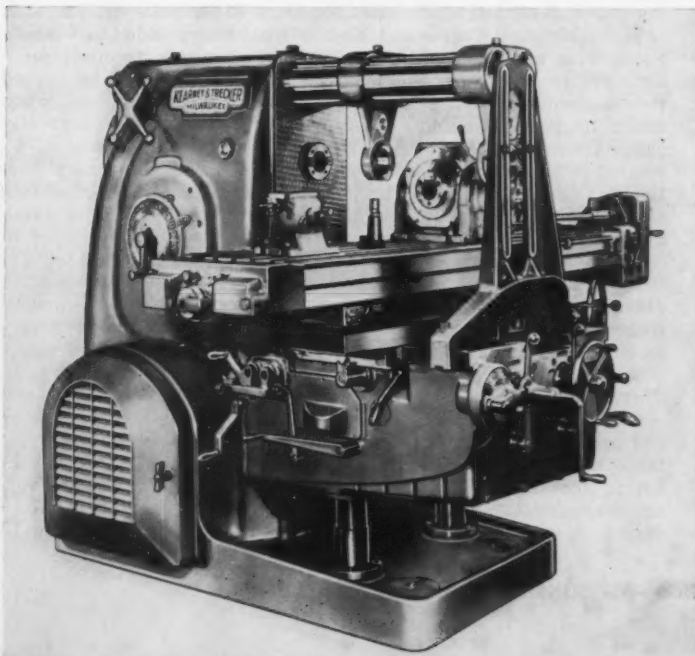
work capacity. Quill feed rate range on both machines is 0.0005 to 0.0148 inch. The No. 3 machine has a 50 to 2500 R.P.M. speed range, while the No. 4 speed range is 40 to 2000 R.P.M.

A five-station rotary indexing machine, Fig. 3, and five standard units which are used on special machines will be exhibited. The five-station machine has been designed for a leading automobile manufacturer to mill six surfaces, saw-cut two ends, and drill five holes in rear-axle differential carriers. Production rate is 94 pieces

per hour. This machine demonstrates how standard units are used in combination for a special production machine. The machine contains four 12-inch feed slides, one 16-inch feed slide, two drill power units, one quill feed unit, and a 60-inch rotary index-table.

Of the five standard units to be displayed, three of them will be seen in action on the special machine. The way type drill unit, Fig. 4, and the lead-screw tapping unit will be separate, but also under power. Four sizes of the feed slide are available, having

Fig. 6. General-purpose, universal, knee type milling machine



Preview of the Chicago Shows

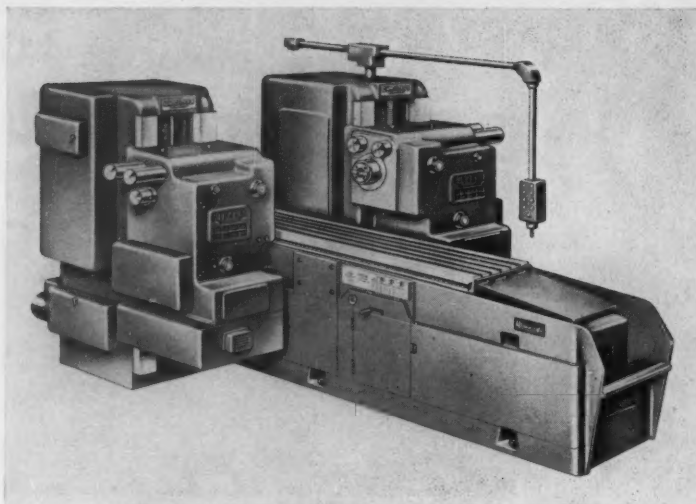


Fig. 7. One of 342 duplex models available in line production, bed type milling machines

12-, 16-, 20-, and 24-inch wide these rotary index-tables can be ways. Quill feed units have a clamped hydraulically. maximum stroke of 10 inches, and A mechanical indexing com- a spindle speed range of 200 to 1690 R.P.M., which is variable by limited indexing applications, and change gears and sheave diameters completely eliminates all mathe- ters. A 3-H.P. motor provides automatic guesswork in indexing, capacity for six 1/2-inch drills in will also be shown. Called the cast iron at 5 inches per minute Compuindex, this unit can be and 500 R.P.M.

The way type drill unit is nor-ing heads and rotary tables. It will mally used for heavier cutting divide a circle into any number of loads. This unit has a 2 1/2-inch equal parts from 1 through 1099, diameter cylinder bore and a maxi- and will index all even numbers mum stroke of 16 inches. Spindle through 2198. It has the ability to speed range is 98 to 1691 R.P.M., index by degrees to as low as 10 and the feed rate range, 1 to 16 minutes of arc.

inches per minute. The lead-screw No index-plates, followers, gear tapping unit can be arranged to charts, hole log sheets, loose parts, tap ten different thread sizes in or other superfluous equipment is both the National Coarse and Na-required. Every index is visually tional Fine series, in addition to and progressively recorded on a six sizes in pipe taps. Single ascouter. The unit can be turned well as multi-spindle arrange-backward any amount, and, when ments are possible. Spindle speeds moved forward, will correctly range from 80 to 280 R.P.M. The pick up previous indexes.

correct lead and speed for a par- A standard line of general-pur- ticular tap size is obtained by in-pose, knee type milling machines stalling the proper lead-screw, will also be exhibited. This stand- nuts, and driver and driven gears, and TF Series is quite similar in

The rotary index-table and base appearance to its deluxe TK is available in four different table counterpart, with the exception of diameters, 36, 48, 60, and 80 the column design which employs inches. Work-holding fixtures are dovetail ways, and the power arm- mounted to suit, and any number arrangement which provides inde- of practical indexes are available. pendent motors for spindle speed, There are four major components feed, and coolant. A heavier and —the center post, sub-base, table, wider knee is also supported by and gear-box. The center post con-twin elevating screws.

tains the hydraulic cylinder for The TF Series is offered in lifting the table while indexing, plain, universal (Fig. 6), and ver- and clamping the table after in-tical styles, from No. 2 to No. 6 dexing. Also, fixtures mounted on in size and with motors from 10

to 50 H.P.. Feed selection offers thirty-two changes from 3/8 to 90 inches a minute. Twenty-four spindle speeds are provided—from 15 to 1500 R.P.M. on Nos. 2 and 3 machines, and from 13 to 1300 R.P.M. on Nos. 4, 5, and 6.

Also to be displayed is a new line of production, bed type mill- ing machines. The new series, designated as Mil-waukee-Mil, of- fers a total of 93 simplex and 342 duplex models. One of the duplex models is illustrated in Fig. 7. There is a choice of twelve dif- ferent table sizes, and three differ- ent spindle heads—each with a choice of three horsepower ratings and three spindle speed ranges. An arrangement for automatic, electro-hydraulic program control is provided for power feed of table, spindle heads, and quills.

Twenty-four table feed changes are available from 1/2 to 50 inches per minute, and power rapid trav- erse rates vary up to 300 inches per minute. The spindle heads have nine different spindle speed ranges, each with sixteen speed changes.

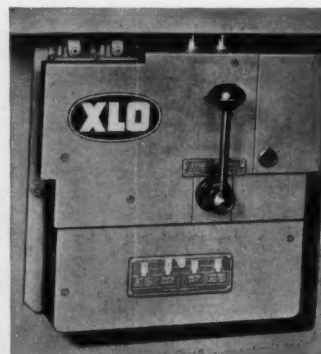
Also to be disclosed are several developments of tracer-controlled, skin- and spar-milling machines, which are new products of the company's recently formed air- craft machine division.

Indicate Item 202 on postcard, page 325

New Control Panels for Ex-Cell-O Machines

Machine Tool Show, Booth 1319

A new hydraulic control panel, to be shown by Ex-Cell-O Cor- poration, Detroit, Mich., will be applied to all of the hydraulically



Hydraulic control panel to be incor- porated on hydraulically operated Ex-Cell-O precision boring machines

Preview of the Chicago Shows

operated precision boring machines of the company. Some advantages of the new panel are faster rapid traverse for shorter machine cycle time, snubbing action for smooth deceleration from rapid traverse to either feed or stop positions, higher feed rates for machining aluminum and other soft metals, complete single-lever manual control, dwell control by means of an electric timer, constant feed regardless of resistance encountered, and enclosed feed-control compartment with lock.

Wiring on the new panel, which is manifold mounted and readily removable, is spliced to the electric equipment leads within a sealed compartment. The panel and the complete hydraulic systems of the machines conform with J.I.C. specifications.

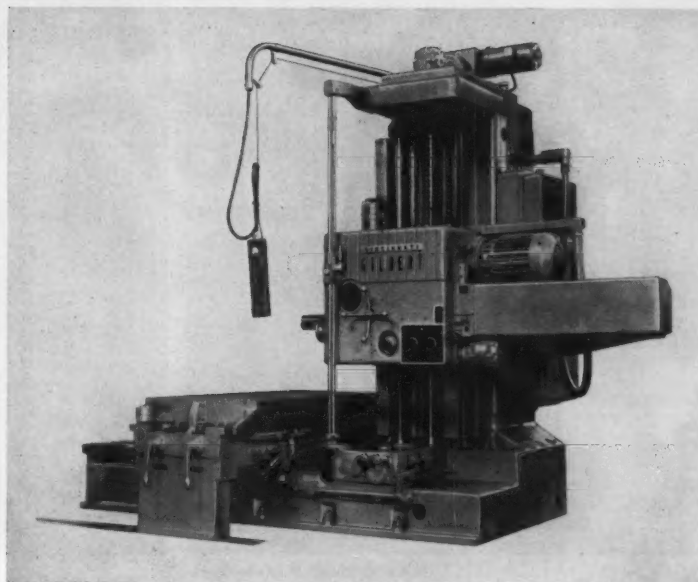
Indicate Item 203 on postcard, page 325

Cincinnati Gilbert Boring Mill

Machine Tool Show, Booth 816

Cincinnati Gilbert Machine Tool Co., Cincinnati, Ohio, is showing a 4 1/2-inch compound table type horizontal boring, milling, and drilling machine. The equipment has a push-button pendant control of machine movements and automatic positioning of the head and table. Power feeds and speeds can be pre-selected. Saddle supports beneath the table and their under-floor runways are a distinctive feature of this machine.

The company will also exhibit a 9-inch column radial drilling ma-



Saddle supports and under-floor runways are a feature of this boring mill

chine having an automatic tapping reverse, a 50-inch power revolving table with dial indicator indexing, and a 22-inch universal tilting and revolving table.

Indicate Item 204 on postcard, page 325

Snyder Machine Models on "Wheel of Automation"

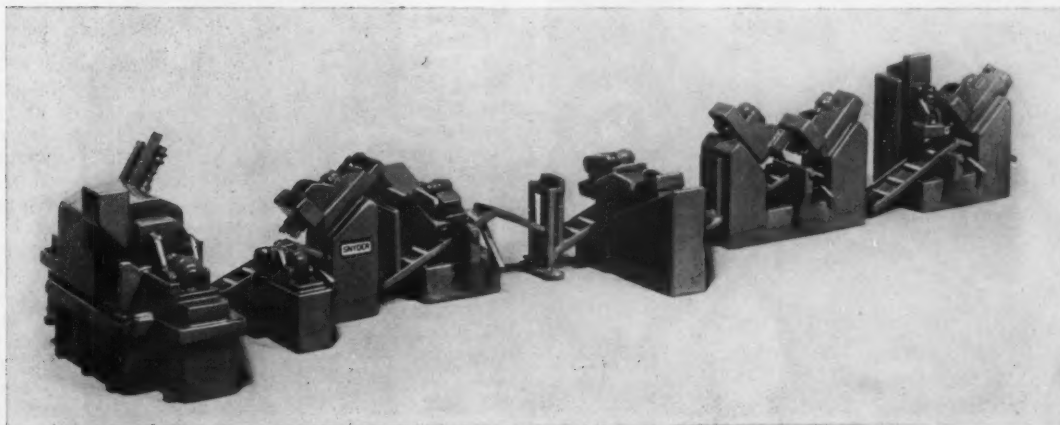
Machine Tool Show, Booth 1222

A 5-foot "Wheel of Automation" having scale models of ten different types of transfer machines will be displayed by the Snyder Tool & Engineering Co.,

Detroit, Mich. One of the main attractions on the wheel is a model of a previously unannounced transfer machine for automobile rocker arm shafts featuring fully segmented automation.

This machine has eight stations and is 53 feet long. Actually it is a series of six individual machines, each with a separate control panel, loading conveyor, and hopper feed. Thus, with pre-conditioned stock at various points along the machine, it is possible to maintain production when certain areas are shut down for maintenance or tool changes.

Indicate Item 205 on postcard, page 325



Snyder fully segmented transfer machine permits uninterrupted production

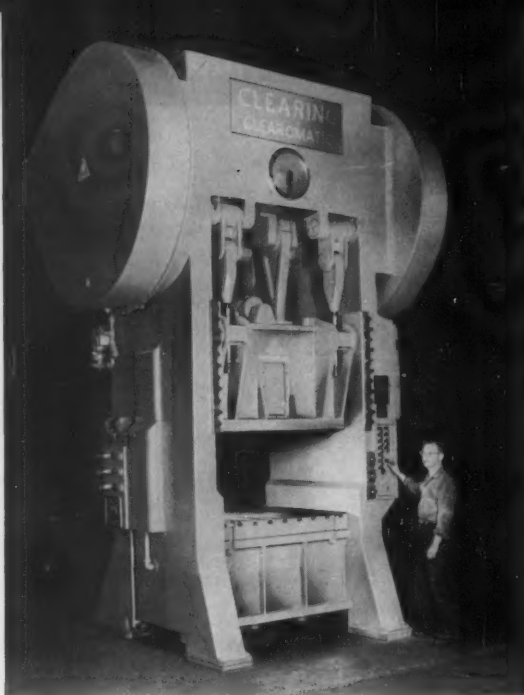


Fig. 1. Clearomatic press features a two-speed, planetary gear clutch that speeds the slide during up stroke and approach



Fig. 2. Three power cylinders and two separate pull-back cylinders provide this hydraulic press with a rapid cycling rate

Clearing Presses to be Displayed

Machine Tool Show, Booth 716

One of seven presses to be exhibited by Clearing Machine Corporation, Division of U. S. Industries, Inc., Chicago, Ill., will be the crank type Clearomatic press, Fig. 1. The heart of this press is its clutch, which provides a me-

chanical means of changing the rotative speed of the drive-shaft while the press is cycling. During the working stroke, the press is operated at low speed; during the return stroke and the approach, it is shifted to high speed. The

Clearomatic clutch can be adapted to many types of single- and double-action presses with either underdrive or overdrive.

The H-300-42 single-point hydraulic press, Fig. 2, will be operated under load. Electrical controls are completely built into the machine frame. The hydraulic circuit features an intermediate

Fig. 3. Recently developed mechanical press incorporates hydraulic overload safety device



Fig. 4. Clearing P type press has fully enclosed electrical and pneumatic controls

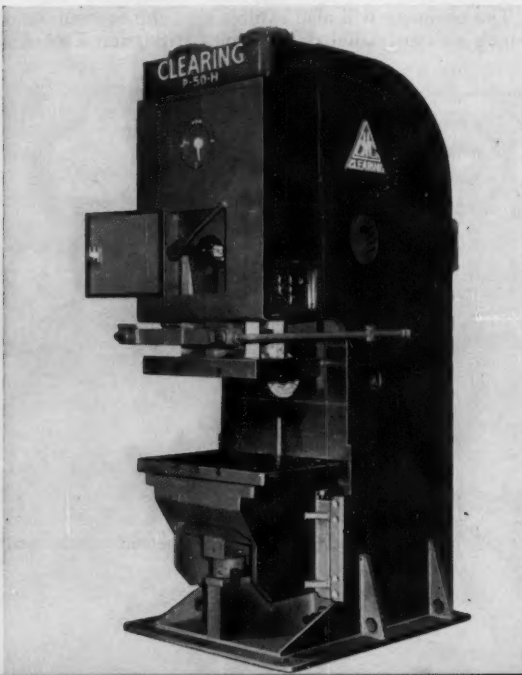




Fig. 1. LeBlond-Carlstedt "Rapid Borer" for fast boring, trepanning, or counterboring

"prepress" slide motion. Beginning at the top of the stroke, the slide approaches rapidly in a free fall. At a set point, low tonnage is applied at a fast slide speed. Still lower in the stroke the press phase is begun, the slide slows down and applies full tonnage. The up stroke is quickly accomplished by separate pull-back cylinders.

Also to be demonstrated will be the F type single-action, straight-side press with an eccentric gear drive, illustrated in Fig. 3. All pneumatic and electrical controls are built into compartments in the frame. The press is equipped with a newly developed safety device that prevents damage to the press in the event of an overload. This device, which is completely contained within the slide, provides a hydraulic cushion under the adjustment units. Should an accidental overload occur, the hydraulic units will give way and avoid damaging or sticking the press.

The P type press, Fig. 4, has been especially designed to the rigid specifications of automotive manufacturers. It is a gap-frame press with a front-to-back drive. All drive mechanisms and controls are enclosed within the frame. Included in the exhibit will be an S type press of a twin-gear, two-point crankshaft design; an I-60 open-back inclinable press; and a 75-ton horning press equipped with a pneumatic clutch. The operation of a Clearing Hi Pro Draw press will be demonstrated by a plastic working model.

Indicate Item 206 on postcard, page 325

LeBlond Lathes and Boring Machine

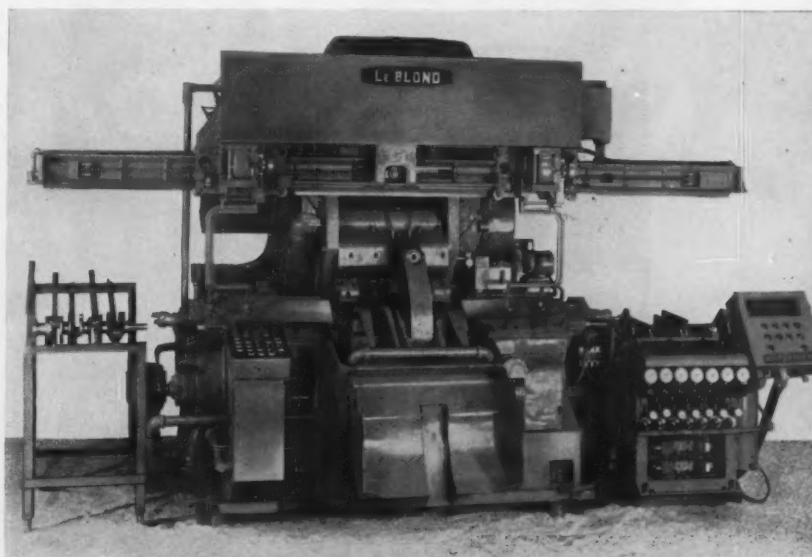
Machine Tool Show, Booth 1313

A LeBlond-Carlstedt "Rapid Borer," Fig. 1, will be one of the feature exhibits by the R. K. LeBlond Machine Tool Co., Cincinnati, Ohio. This machine is capable of extremely fast boring, trepanning, or counterboring. The machine will be demonstrated boring 1 1/8-inch diameter holes in solid, type 303 stainless steel bars, 8 inches long, at better than 7 inches per minute.

The Rapid Borer accommodates

revolutionary new tooling which cuts at very high speeds with excellent accuracy and finish. Cutting oil is forced between the boring-bar and hole wall, forming a continuous bearing, and is flushed back through a hole in the boring head and bar, thus carrying away chips. Chip form is controlled both by tool angles and proper feed and speed combination. A wide variety of hole diameters and depths, as well as

Fig. 2. Automatic machine for turning five main bearings, and other parts of crankshafts



Preview of the Chicago Shows

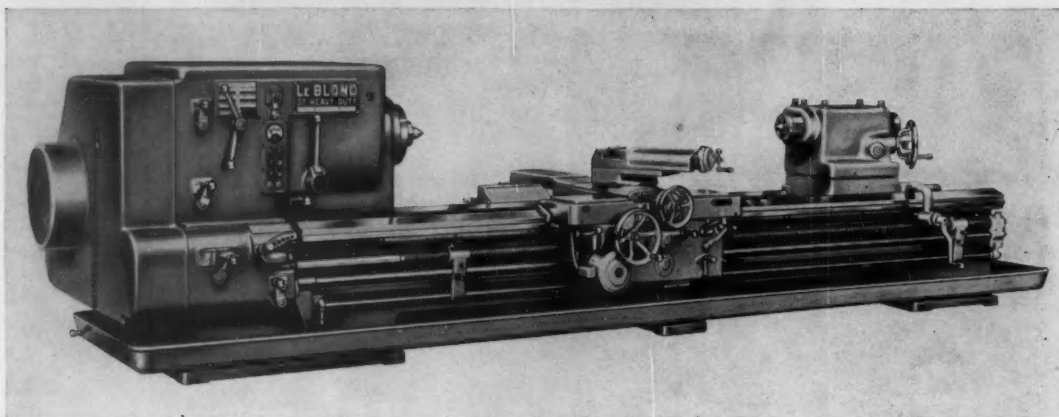


Fig. 3. This 32-inch, heavy-duty engine lathe offers thirty-six spindle speeds

work sizes, can be accommodated.

Another feature at the Show will be the LeBlond automatic crankshaft machine, Fig. 2. On this machine, the five main bearings, flange and pilot, sprocket, and front end of the crankshaft are turned simultaneously at the rate of fifty-five crankshafts per hour. This center-drive machine has facilities for automatic loading and unloading, and clamping is hydraulic. Machine motions

are sequenced electrically and hydraulically for continuous automatic operation. All operations are controlled and indicated from a master push-button station.

Among the other machines to be displayed will be 25-inch and 32-inch, heavy-duty engine lathes, the larger machine being shown in Fig. 3. These lathes have been designed to take advantage of the most recent developments in carbide tooling. The 32-inch lathe has

a 60-H.P. motor, and thirty-six spindle speeds from 5 to 500, R.P.M. are available. The 25-inch lathe uses a 50-H.P. motor, and offers spindle speeds from a 6 to 625 R.P.M. Adjustable acceleration is provided for starting, stopping, and jogging heavy work-pieces by means of rheostat control of the electric clutch and brake.

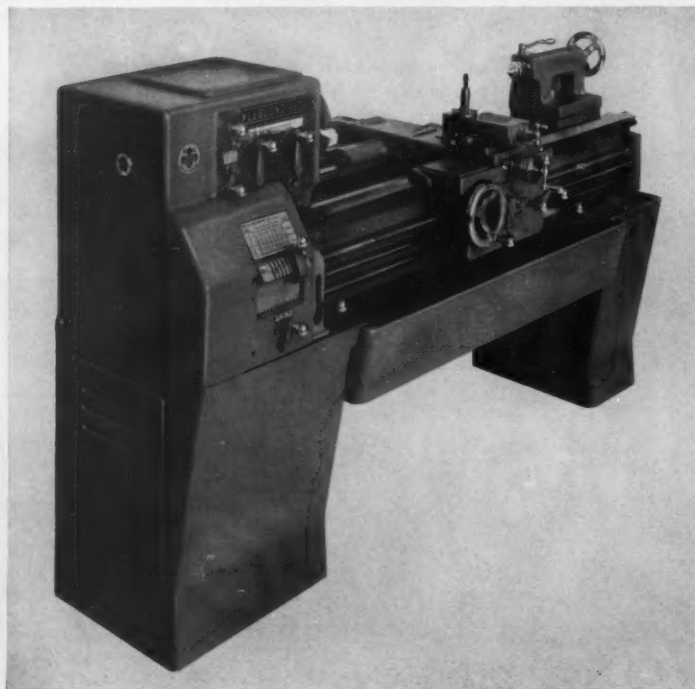
Also to be exhibited are four models of the company's Regal lathes, such as that seen in Fig. 4. The four lathes will be of 13-, 15-, 17-, and 19-inch swing sizes. Headstocks have a combination gear-belt drive to provide eight geared speeds and four higher speeds through a belt.

The 16-inch, heavy-duty engine lathe illustrated in Fig. 5 offers twenty-seven spindle speeds from 16 to 2000 R.P.M. through a combination gear-belt drive headstock. The spindle is mounted in three bearings, with the center bearing supported in a Timken "semi-flexible" mounting. A heavier apron has four-directional power rapid traverse combined in one lever.

A combination gear-belt drive headstock is also provided on the company's 15-inch, dual-drive lathe, Fig. 6, to provide sixteen spindle speeds from 30 to 2400 R.P.M. This lathe has a 5-H.P. motor, and speed selection is by means of a single lever. A totally enclosed quick-change gear-box permits selecting forty-eight feeds and threads. The heavy-duty, thrust-lock tailstock is provided with a length dial. The chip pan slides in grooves for easy clean-out or removal.

Among the other lathes to be exhibited is a 25-inch, sliding bed

Fig. 4. Regal lathe features a combination gear-belt drive construction in headstock



Preview of the Chicago Shows

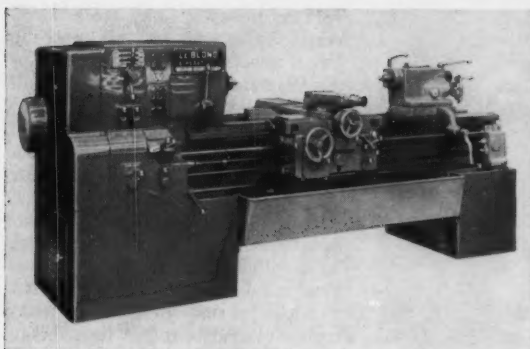


Fig. 5. Twenty-seven spindle speeds from 16 to 2000 R.P.M. are available on this 16-inch engine lathe

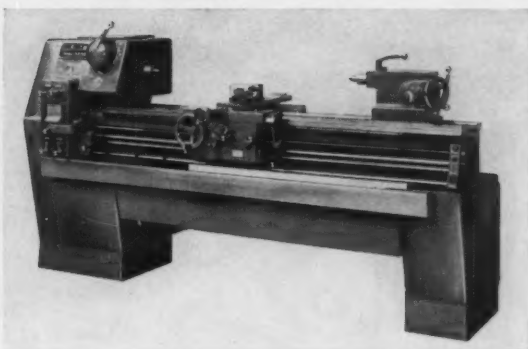


Fig. 6. LeBlond 15-inch, dual-drive lathe permits selecting forty-eight feeds and threads

gap lathe. The sliding bed arrangement allows a variable gap which permits a 50-inch swing. The bed may also be extended to handle extra-long work-pieces.

Also, a 32-inch, heavy-duty lathe having a 125-H.P. motor, and a 50-inch, roll-contouring lathe will be displayed.

Indicate Item 207 on postcard, page 325

for high-speed continuous hobbing of small, precision spur gears, pinions, and special tooth forms. It features two hobbing speeds of 525 and 1044 R.P.M. Gears having an outside diameter of 0.050 to 2 inches and a face up to 1.6 inches wide can be generated.

The company's Varimatic precision drilling machine is illustrated in Fig. 3. Speed adjustment is infinitely variable in two ranges, from 840 to 9300 R.P.M. Drills up to 5/16 inch in diameter can be accommodated. Shown in Fig. 4 is a precision tapping ma-

Hamilton Exhibits Hobbing, Drilling, and Tapping Machines

Machine Tool Show, Booth 212

Hobbing, drilling, and tapping machines will be displayed by the Hamilton Tool Co., Hamilton, Ohio. Shown in Fig. 1 is a No. 1 gear-hobbing machine having

twelve hobbing speeds ranging from 109 to 1259 R.P.M. Speeds, feeds, and indexing can be set up independently. The No. 00 hobbing machine, Fig. 2, is designed

Fig. 1. Hamilton gear-hobbing machine



Fig. 2. Hobber for small, precision gears



Preview of the Chicago Shows

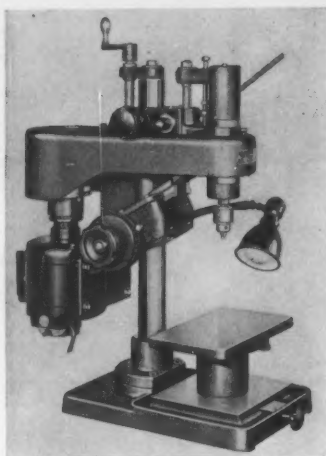


Fig. 3. Varimatic drilling machine

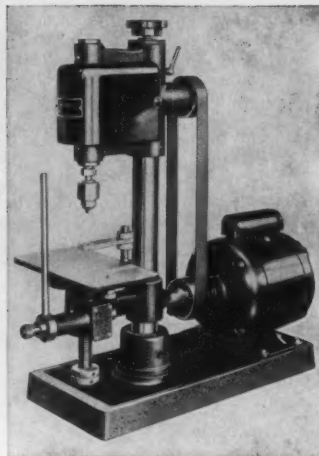


Fig. 4. Hamilton tapping machine

chine. Features include spindle speeds from 1200 to 2600 R.P.M., automatic reversal of the tap at the bottom of a hole, and feed-

stops adjustable within a range up to 1 3/4 inches. The machine handles taps up to a No. 10-32.

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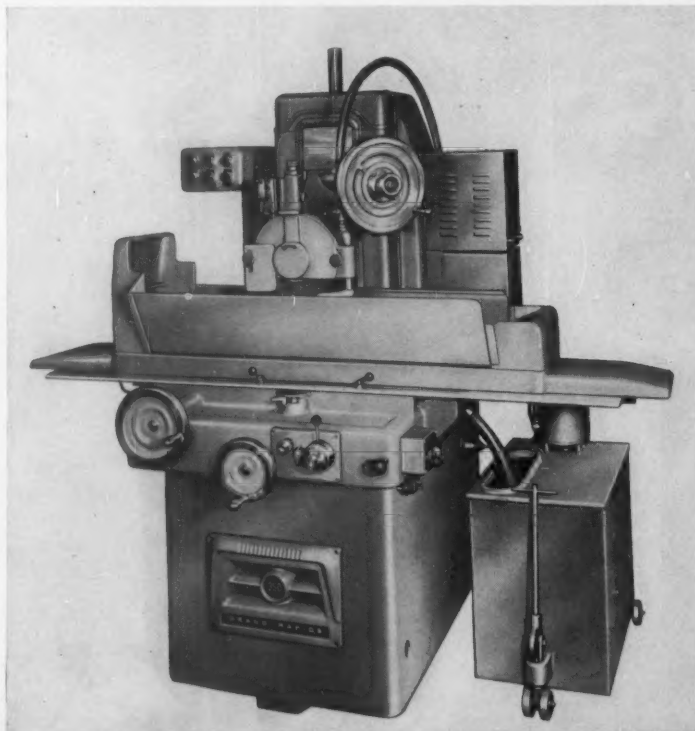
Grand Rapids Hydraulic Feed Surface Grinder

Machine Tool Show, Booth 906

Gallmeyer & Livingston Co., Grand Rapids, Mich., will feature a No. 350 hydraulic-feed surface grinder having an 8- by 24-inch table working surface, with a ca-

capacity of 12 inches under a full 10-inch diameter wheel. This machine is built around a rugged, one-piece column and base for permanence of alignment between

Gallmeyer & Livingston hydraulic-feed grinding machine



vertical headways and cross-travel ways. The head of the machine has a precision ball bearing spindle carried on pre-loaded ball bearing ways.

Vertical movement is actuated by a handwheel on the head. A large, outer handwheel is used for coarse adjustment of the head, with the wheel graduated in thousandths of an inch, widely spaced. A smaller, inner handwheel is graduated in tenths of thousandths of an inch, with spacings between graduations large enough to be split if necessary. One turn of the large handwheel provides 0.060 inch of vertical movement; while similar rotation of the small handwheel gives 0.012 inch of vertical movement.

A hydraulic pump and control valve provide an infinite number of longitudinal table speeds ranging from 3 inches to 125 feet per minute, instantly variable by means of a control on front of the saddle. The handwheel for operation of longitudinal table movement is automatically disengaged as the hydraulic feed starts.

The hydraulic cross-feed is variable up to a maximum of 3/8-inch per table reversal, and the amount is established from the control panel or by means of a handwheel. A variable-speed, continuous cross-feed for dressing or positioning is standard equipment.

The grinding wheel spindle is driven through V-belts by a 2-H.P. motor mounted on an adjustable bracket attached to the head of the machine so as to provide two usable spindle speeds. The hydraulic mechanism is driven by a 1 H.P. motor conveniently housed within the base of the grinder.

The machine may be equipped with a diamond dresser built into the grinding wheel guard so as to permit dressing the wheel periphery without disturbing the wheel-head setting or removing the work from the table. Provision has been made for guarding the table dogs to prevent the possibility of injuring the operator.

Magnetic starters are enclosed in a dust-tight compartment cast into the side of the column of the machine, and a disconnect switch is mounted in such a manner as to prevent the opening of the door to the switch compartment with the current on. Heavy duty oil-tight push buttons are conveniently located.

Indicate Item 209 on postcard, page 325

Show Previews

Lo-Swing Exhibit to Feature Automation Installations

Machine Tool Show, Booth 1013

Seneca Falls Machine Co., Seneca Falls, N. Y., will introduce several new production machines and provide a demonstration of some compact, efficient automation installations. Included in the exhibit will be the installation illustrated in Fig. 1. This battery of machines consists of two Model LR Lo-Swing lathes that automatically load, unload, transfer, and turn several diameters, faces, and chamfers on both ends of electric motor shafts.

A rotary type automatic loader assures a constant flow of pump gears through the automatic Imp lathe shown in Fig. 2. This machine turns, faces, and chamfers in a completely automatic cycle. The work-pieces are placed in a loading chute from which they feed by gravity to openings in the rotary loader which, in turn, indexes them to the proper position. Revolving spindles—withdrawn during the indexing phase—then pick them up for machining. Swing over the front and rear slides is 4 1/2 inches, with two models, having 8 or 12 inches between centers, being available. Three spindle speed ranges, 400 to 1750 R.P.M., 800 to 3500 R.P.M., and 1020 to 4500 R.P.M., are provided.

The Model AP tracer type lathe, Fig. 3, is a fully automatic, high-speed machine that can be easily set-up and operated. It is particularly recommended for machining shafts in small or medium size lots, using a simple type of master template to reproduce the size and profile required. The lathe may also be equipped with fully automatic, cam-operated back-squaring attachments for facing shoulders or for under-cutting operations. Swing for the front and rear slides is 7 inches. The distance between centers on two sizes of this machine is 40 and 60 inches. Spindle speed ranges are 82 to 375 R.P.M., 136 to 622 R.P.M., and 196 to 900 R.P.M.

A "walking beam" type of loader and several vises equip the Model CS centering machine, shown in Fig. 4, for completely automatic operation. The loader has two work-carrier arms which operate with a rotating movement

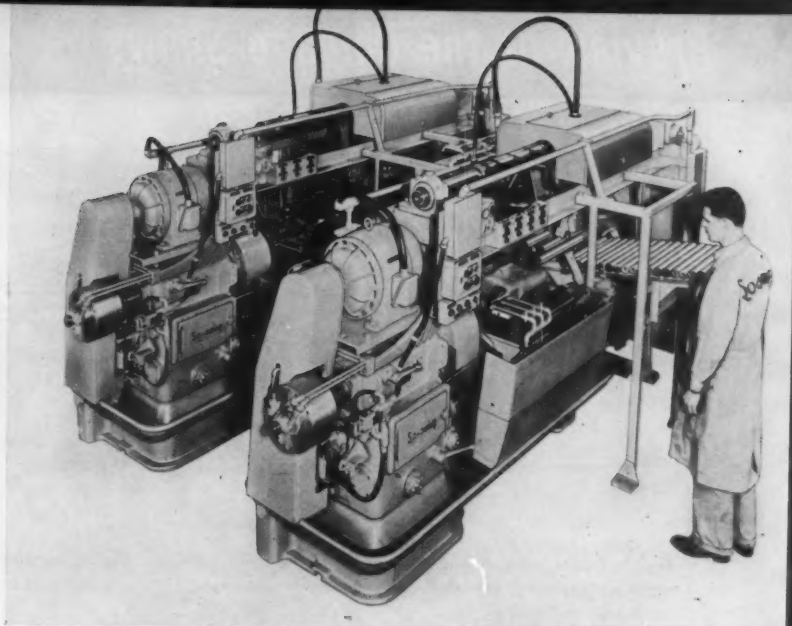
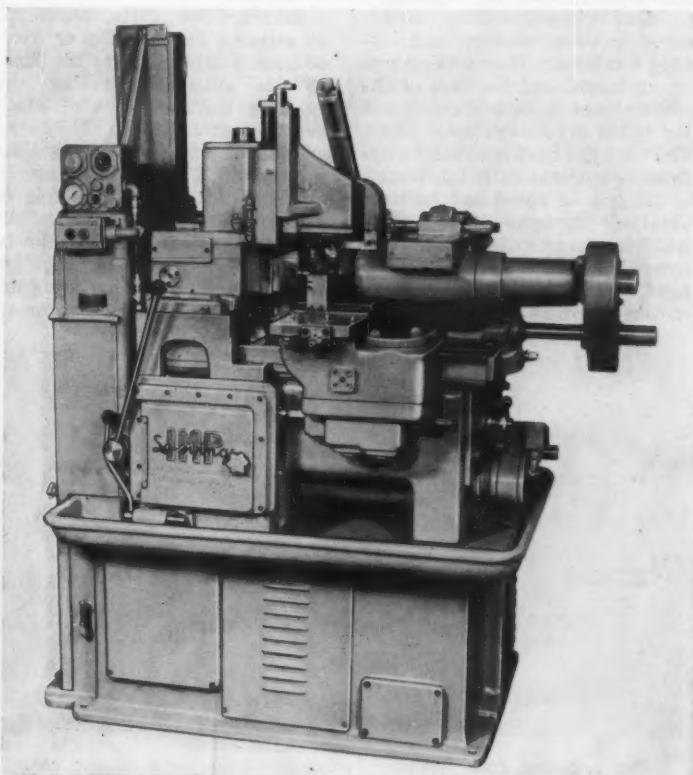


Fig. 1. Bank of two Lo-Swing lathes for the automatic handling and machining of electric motor shafts.

and handle both rough and finished pieces simultaneously. As the unloading arms remove and eject a finished piece, the loading arms pick up a rough piece and lower

it into the vise jaws. It is then automatically clamped in position and the feed-clutch activated. The height of the spindle above the bedways is 9 1/4 inches. Capac-

Fig. 2. Imp lathe to be demonstrated by Seneca Falls Machine Co.



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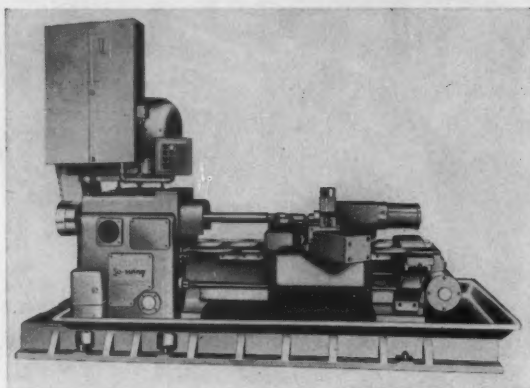


Fig. 3. Tracer type, fully-automatic Lo-Swing lathe for machining shafts in small and medium size lots.

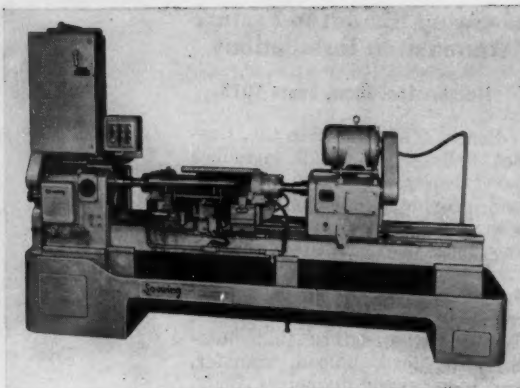


Fig. 4. Automatic drilling and centering machine has a "walking beam" type loader for handling shafts.

ities of three standard air-operated vises are $3/4$ to $2\frac{1}{2}$ inches diameter, $2\frac{1}{4}$ to $3\frac{3}{4}$ inches diameter, and $3\frac{1}{2}$ to 5 inches diameter. The distance between center drills on four machine sizes are 18, 42, 66, and 90 inches. Two spindle speed ranges, 235 to 1215 R.P.M. and 438 to 2264 R.P.M., are provided.

The "Waydrill" unit, Fig. 5, is completely self-contained and operates from a single motor. Several of these units may be grouped together to handle drilling, boring, reaming, counterboring, and tapping operations. They will operate at any angle, and the face of the sliding head is both flanged and jig drilled to receive cluster heads. The base has hardened steel ways that are automatically lubricated.

Changes of speed and feed are obtained through pick-off gears which are housed under removable covers on the sides of the sliding head. Feed and rapid traverse movements may be engaged and

disengaged as required during the stroke. The drilling head is designed to permit two rates of drilling feed by a double train of feed gears and necessary controls. The drill head is cushioned at end of stroke to prevent break-through of drills. The standard speed range with an 1150-R.P.M. motor is 130 to 1150 R.P.M.; with a 1750-R.P.M. motor, 200 to 1750 R.P.M. Standard drilling feed is 0.004 to 0.017 inch per revolution.

Standardized units, assembled on either a base casting or welded steel platform, form the Model DM automatic drilling and reaming machines, one of which can be seen in Fig. 6. They may consist of one or more drilling heads which, in turn, may be equipped with either a single or a cluster of drilling spindles. An automatic indexing fixture can be fitted to the base. The machines can be equipped with fully automatic cycling, including automat-

ic pick-up, loading, machining, indexing, and ejection of the finished part. Spindle speed ranges are either 130 to 1150 R.P.M., or 200 to 1750 R.P.M.

Also to be shown is a Model LN, platen type, Lo-Swing lathe. This machine is fully automatic and cam operated. Although the lathe will be used principally as a chucking machine, the bed has

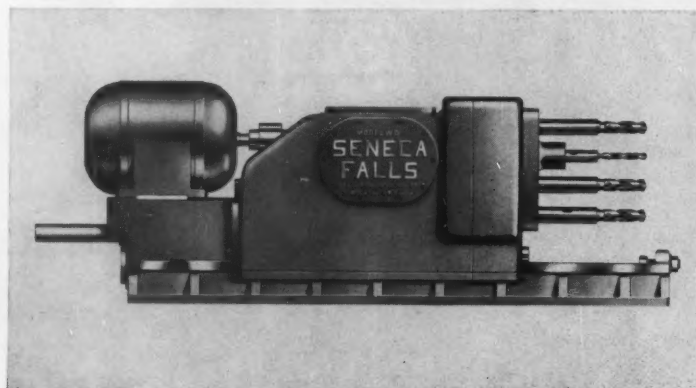


Fig. 5. Seneca Falls "Waydrill" production drilling and tapping unit.



Fig. 6. Automatic drilling and reaming machine constructed from standardized units.

been designed to accommodate an air-operated tailstock without obstructing movement of the platen. The machine can be equipped with automatic work-handling devices for either individual operation or in-line automation.

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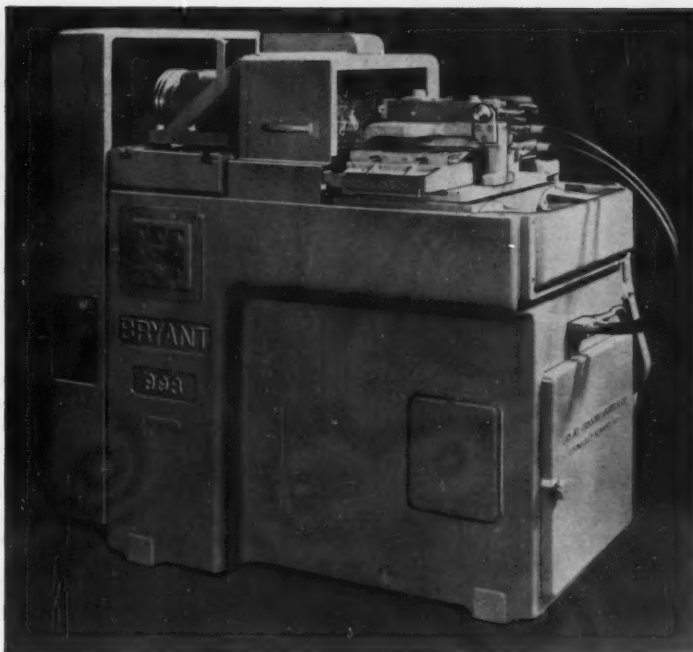


Fig. 1. Bryant precision boring machine equipped with cross-slide for generating with single-point tools, and a dial type boring-bar

Bryant Boring and Internal Grinding Machines

Machine Tool Show, Booth 1015

One of the precision boring machines made by the Bryant Chucking Grinder Co., Springfield, Vt., will be tooled to turn, bore, chamfer, and face both sides of clutch collars at the rate of eighty pieces per hour. The machine, seen in Fig. 1, is equipped with a cross-slide to allow generating the gear faces with single-point tools, and

a dial type boring-bar for maintaining close tolerances. The work-pieces are held in a six-jaw hand-operated chuck, and coolant is supplied from a low-pressure system. A similar machine will be equipped to force coolant through the drills in a demonstration of precision deep-hole drilling of Sundstrand pump piston-rods.

A Bryant cam-operated, automatic internal grinder will be combined with a Landis Concentric grinder, Fig. 2, for grinding the outer cylindrical surfaces and bores of New Departure 3203 inner bearing races at the rate of 220 pieces per hour. The work-pieces, which have previously been face ground, are fed into the Landis machine from a hopper and elevator. During cylindrical grinding, the races are held in a shoe centerless fixture with a magnetic driver, which permits rapid loading and unloading and eliminates distortion.

After grinding, the races are automatically checked by a post gage, which sends correction signals to a Bryant Process Controller, a statistical device which insures that parts are being ground within desired tolerance limits. The Controller makes the necessary changes in the settings of the Landis machine to produce correct size parts. The post gage measures the races and puts this size information into three categories. Information on the number of parts falling into each category is transmitted to the Controller.

After checking, the work-pieces are conveyed to a pre-gaging station, and then conveyed by elevator to an accumulator chute on the Bryant internal grinder. Rough bore grinding is controlled through diamond sizing which is governed by a simplified Process Controller receiving signals from the cross-feed cam of the machine. Finish bore grinding is controlled by air sizing. After finish grinding to within 0.0002 inch

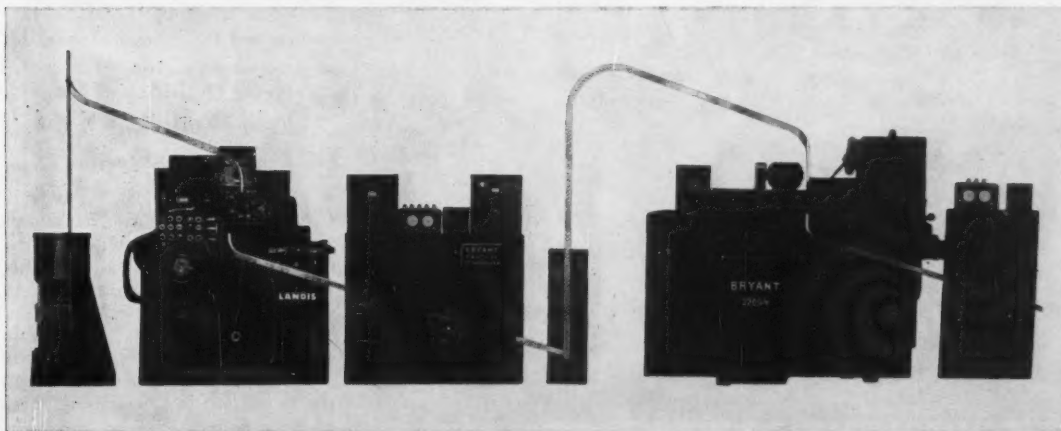


Fig. 2. Bryant cam-operated, automatic internal grinder combined with Landis cylindrical grinder

Preview of the Chicago Shows

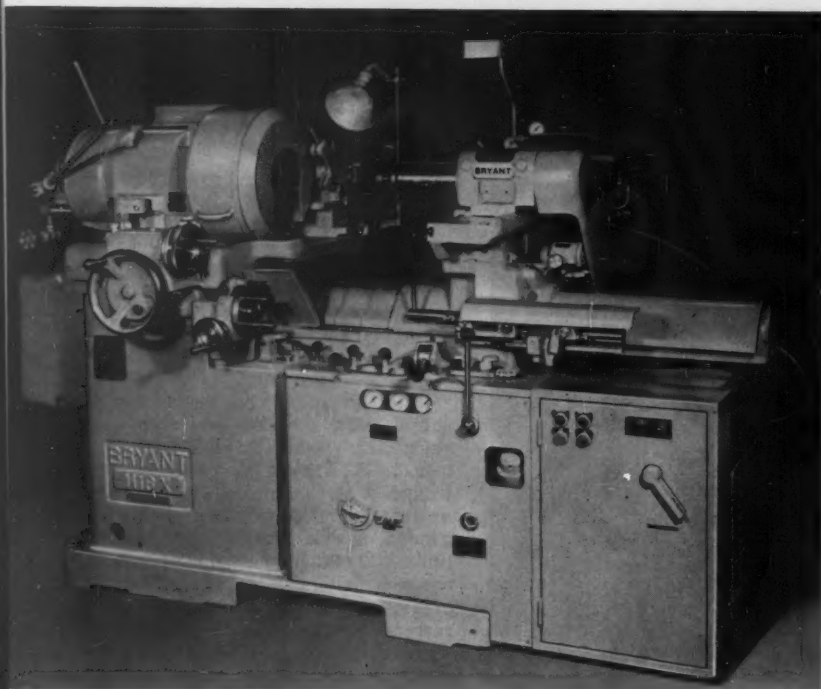


Fig. 3. Hydraulic internal grinding machine for finishing ring gage bores to a surface finish of 1 micro-inch r.m.s.

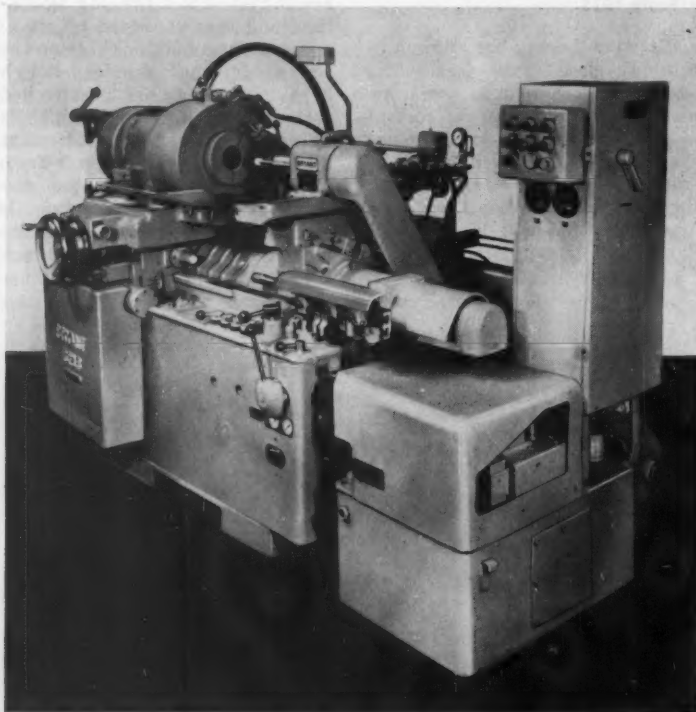


Fig. 4. Colored lights and a special panel will demonstrate the grinding cycle and operation of this automatic machine

of the required size, the races are checked automatically on a post gage, demagnetized, carried by elevator to an ultrasonic cleaning station, and dried by air blow-off.

The hydraulic internal grinder seen in Fig. 3 will grind the bores of ring gages to demonstrate the fine finish—1 micro-inch r.m.s.—and the extreme accuracy obtainable. An extra-fine cross-feed is provided, with the feed-wheel graduated in increments of 0.000020 inch, and one revolution of the feed-wheel advancing the cross-slide 0.00625 inch. Other features of this machine include a super-precision work-head capable of holding work within 0.000010 inch for out-of-roundness and straightness, a refrigeration system for maintaining a constant temperature of the oil used in the hydraulic system, and a vacuum filter to insure clean coolant.

A demonstration of straight bore grinding will be performed with the automatic internal grinder shown in Fig. 4. A system of colored lights will show how the machine functions throughout the entire grinding cycle. Also, a special panel will illustrate how the cross-slide and automatic controls operate. The machine will be grinding the bores of Shelby tubing at a rate of sixty pieces per hour, removing 0.010 inch of stock and holding size within 0.0003 inch.

Another hydraulic internal grinder will be used to demonstrate combined bore and face grinding with a single chucking of the work. The work-pieces will be port plates, which must have their faces flat within 0.0003 inch. Production will be at the rate of forty per hour.

Indicate Item 211 on postcard, page 325

Reed Cylindrical Die Thread-Rolling Machine

Machine Tool Show, Booth 703

The Reed Rolled Thread Die Co., Worcester, Mass., will unveil a new two-die type, cylindrical die thread-rolling machine. Positive cam action designed to bring the dies into the rolling position is a feature of this Model B 110 machine, which is said to be suited for job shop operation as well as long production runs.

The machine can be quickly changed over from one thread

Preview of the Chicago Shows

size to another and matching of the dies is a simple process. It will handle work up to 2 inches in diameter and is adaptable to a wide range of production rates, depending on the nature of the work. Through-feed as well as in-feed operation can be employed. Auxiliary equipment is available for automatic feeding and handling of a wide range of odd-shaped parts.

The company will also show a horizontal three-die type, cylindrical die thread-rolling machine for spline and serration rolling. This machine is set up to roll parts of practically any length up to 20 feet. Axle shafts, transmission parts, and steering mechanism components are typical of the many parts produced.

A Reed A 22 vertical three-die type, cylindrical die thread-rolling machine having a completely automatic feeding arrangement will also be displayed. This exhibit will show how these machines are being incorporated into automated production lines.

Also to be displayed is a completely new line of thread-rolling attachments for automatic screw machines. One of the more important features of these attachments is the ease with which they can be set up and operated. Simplified roll matching is said to greatly reduce set-up time as well as assure better roll life due to the accuracy with which the rolls can be set.

Indicate Item 212 on postcard, page 325

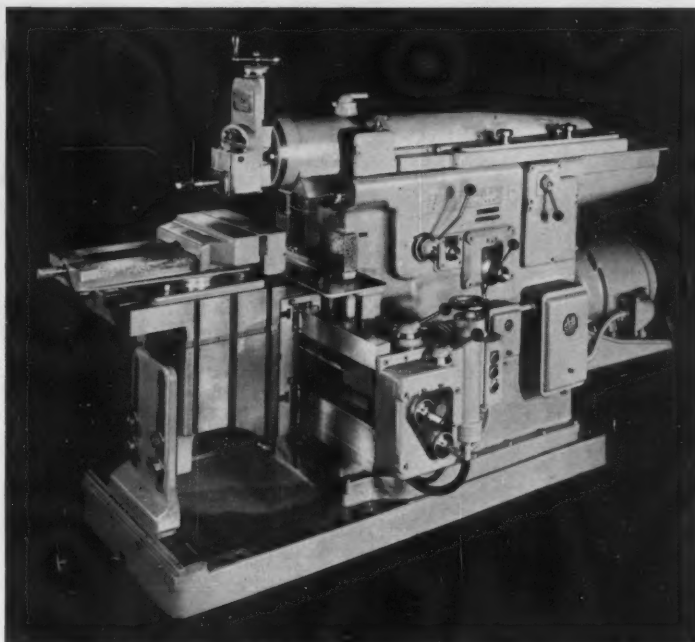


Fig. 1. Rockford 24-inch special, ram type, hydraulic shaper

Rockford Shaper, Planer, and Slotter

Machine Tool Show, Booth 1423

Among the machines and accessories to be displayed by the Rockford Machine Tool Co., Rockford, Ill., will be their latest models of shapers, planers, and slotters. The 24-inch special, ram type, hydraulic shaper shown in Fig. 1 has such basic features as

flame-hardened and ground ram ways; dual controls; a stroke change; and infinite speeds and feeds. Other models manufactured are the 12-, 16-, 20-, and 28-inch models, and the 24-inch heavy-duty size.

The new triple-circuit hydraulic

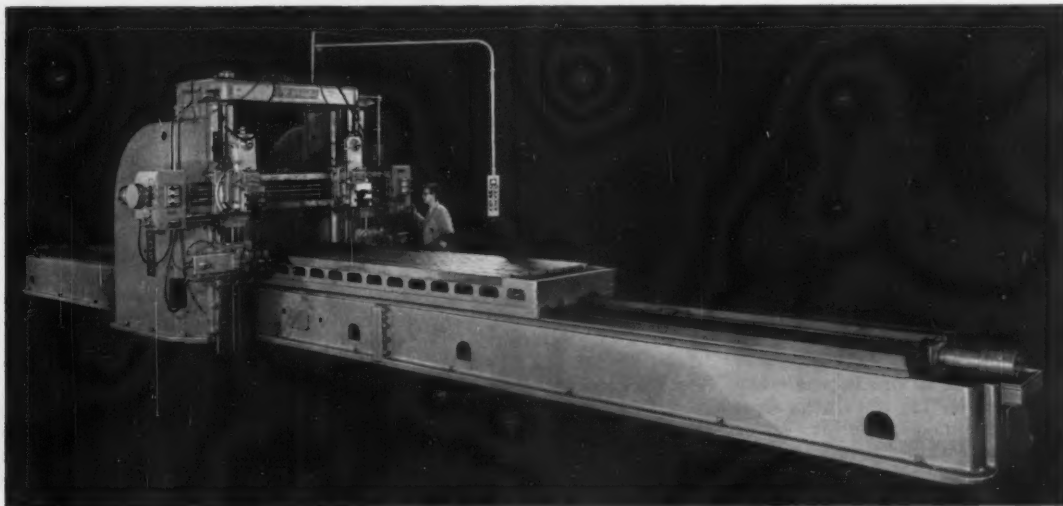


Fig. 2. Triple-circuit hydraulic planer having cutting speeds up to 300 feet per minute

Preview of the Chicago Shows

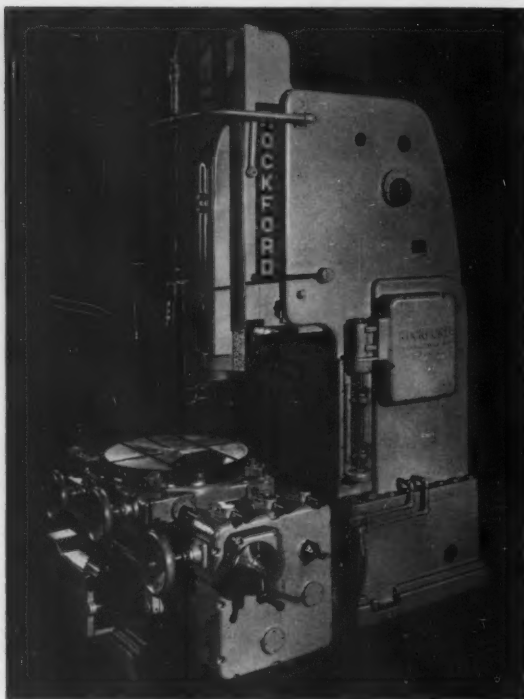
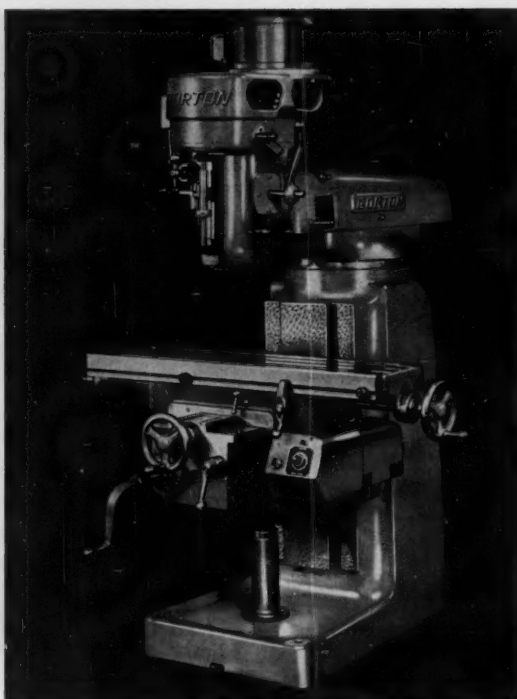


Fig. 3. Hydraulic slotter with a 12- and a 20-inch stroke



Gorton turret type swivel-head milling machine

planer, see Fig. 2, provides a cutting-speed range up to 300 feet per minute. The cutting force which has a power range of 14 tons is proportionately increased as the table speed is decreased. Operation of the machine is by finger-tip pendant control. A dual cylinder arrangement is used for driving the table.

Illustrated in Fig. 3 is the Model SA hydraulic slotter which has a 12- and a 20-inch stroke. This slotter features 90-degree table indexing; a ram with hydraulic fulcrum drive; and a table with rotary, transverse, and longitudinal feed, as well as rapid traverse.

Indicate Item 213 on postcard, page 325

Mastermil Vertical Milling Machine with Turret Type Swivel-Head

Machine Tool Show, Booth 1019

A turret type ram which can be indexed 180 degrees to accommodate high-speed drilling, milling, and grinding attachments is an outstanding feature of a Mastermil vertical milling machine to be demonstrated by the George Gorton Machine Co. This machine can also be equipped with a Gorton duplicator table and tracer head for use in precision die and mold duplicating work. It is especially designed to use high-speed steel and carbide cutters at their maximum capacities for machining a wide variety of materials, including the new die steels and many heat-treated steels.

Spindle speeds ranging from 80 to 5600 R.P.M. permit small cutters to be used at high speeds for delicate work, while cutters up to 1 inch in diameter can be employed for rough stock-removing cuts. The spindle has an infinitely variable down-feed range of from 1/4 inch to 8 inches per minute. A double range of spindle speeds is available for use when employing dial indicators and end measuring rods for jig boring.

The standard machine is furnished with the manufacturer's self-retracting spindle which has both a hand-feed lever and a micrometer down feed with hand

crank. A rugged micrometer depth stop is located on the front of the spindle housing. Spindle bearings are permanently grease sealed. Infinitely variable longitudinal feed to the table, a coolant system, and dial indicators and end measuring rods can be furnished as extra equipment.

Other machines to be shown for the first time include an all-new Gorton P1-2 two-dimensional pantograph and a newly redesigned P3-2 model; and a 1220-1 heavy-duty duplicator table.

Indicate Item 214 on postcard, page 325

Gear Size Control Unit

Machine Tool Show, Booth 1323

An automatic gear size control unit for use with hobbing, shaping, or shaving machines, which stops production automatically when rejects run too high, will be displayed by the Illinois Tool Works, Chicago, Ill. This unit is designed to reject gears that are under size or over size. It accommodates gears up to 3 inches in diameter in various pitches and face widths, and can be set to any tolerance from 0.0001 inch upward.

Show Previews

Rejected gears are delivered from one chute, and passed gears through another chute. In addition, the unit has an integral continuously operating computer that shuts off production when the percentage of rejects reaches a predetermined level, or after a number of continuous rejects.

The percentage-of-rejects selector can be set at any one of thirty levels, from 1 to 33 1/3 per cent. For instance, if the selector is set at 10 per cent, the control will shut off the hobber, shaper, or shaving machine when the percentage of rejects reaches 10 per cent. The consecutive reject selector can be set from 1 to 10, and it, too, will shut off the production machine when the number of consecutive rejects reaches the pre-set level.

When the control unit shuts off the production machine, a red light goes on, indicating to the operator that a corrective adjustment is necessary. There are two such signal lights—one indicates the percentage-of-rejects level and the other goes on when the consecutive reject point has been reached. The computation is continuous. Each time a good gear is passed, the continuous reject counter returns to zero. With each gear passed or rejected, the percentage is recomputed.

Indicate Item 215 on postcard, page 325

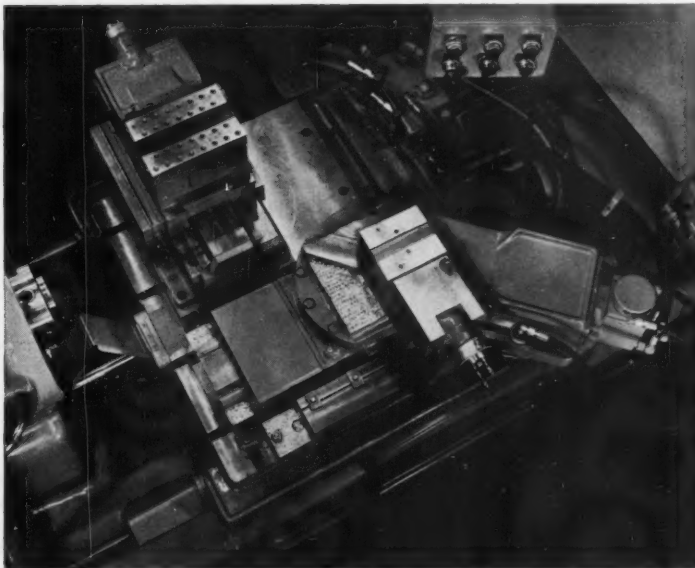


Fig. 2. Close-up of "Air Gage Tracer" and control panel of the Monarch "Hydra-Slide" lathe

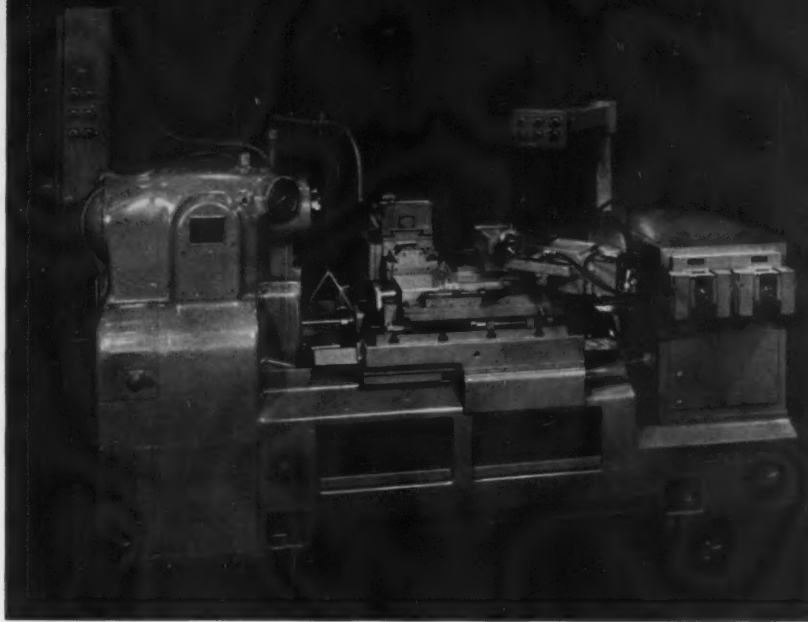


Fig. 1. Monarch "Hydra-Slide" chucking lathe having automatic cycle control

Monarch Introduces New Chucking Lathe with Automatic Cycle Control

Machine Tool Show Booth 920

A high-production chucking lathe for first- and second-operation work, called the Monarch Hydra-Slide will be introduced by the Monarch Machine Tool Co., Sidney, Ohio. This lathe has a work diameter capacity of 15 inches over the front slide and

up to 13 inches over the rear slide. It is designed for fully automatic cycle control of all cutting-tool movements. Once the versatile Hydra-Slide is set for the most efficient feed rates, automatic cycling assures continuous output at maximum capacity.

Both the front and rear tool slides are hydraulically actuated. The front slide is equipped with an "Air Gage Tracer" unit and is used for facing and contour turning or boring. The rear slide is designed for necking and grooving, and when provided with special tooling can be used for facing. In the latter case, automatic hydraulic tool relief is a valuable built-in feature.

A platen incorporating hydraulic transverse movement is employed as the mounting member for the front and the rear tool slides. Movement of the platen permits quick retraction of the tool slides from the work at the conclusion of the cutting cycle to expedite rapid changing of the work-piece.

The automatic cycle control permits great flexibility in the selection of tool slide movements. It provides for simultaneous operation of both front and rear slides. However, either of the two slides may be used individually or the

Preview of the Chicago Shows

rear slide may be set-up to begin its cut after the front slide has completed its operation or vice versa. Controls are located at approximately eye level on a swiveled arm to the right of the platen. Electrical selectors are provided to facilitate setting up the machine for automatic cycle operation.

The main-drive motor may be either an alternating- or direct-current unit of up to 20 H.P., and of the continuous running type. It is mounted on an integral sub-base immediately to the rear of the headstock. Drive to the spindle is direct through a magnetic type clutch and brake which is capable of stopping spindle rotation from even the highest speed in less than two seconds.

Three ranges of spindle speeds are available which provide top speeds of 900, 1850, or 2700 R.P.M. By means of easily changed pick-off gears, eight separate spindle speeds can be secured in each range. The spindle is supported on pre-loaded precision ball bearings and has a 6-inch A-1 flange type nose. An optional D-1 Camlock nose is also available. Lubrication for all moving parts is supplied by a mist type system with an individual motor-driven pump. A tachometer on the front of the headstock gives a constant indication of the spindle speed.

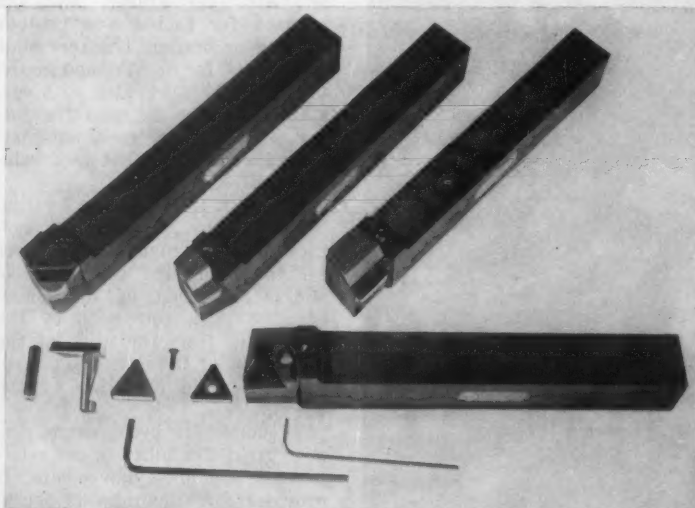
The "Air Gage Tracer," mounted on the front slide, allows a single continuous tool cut to be

utilized to impart a fine, stepless finish to the work-piece. The power unit and hydraulic oil reservoir for the "Air Gage Tracer" are located in the control cabinet at the left-hand end of the machine. Air at a constant pressure of 60 to 65 pounds per square inch is supplied by the user. Provision of both longitudinal and angular adjustment serves to speed up accurate set-ups. The combining of both tracer control and automatic cycle operation is said to enable successive duplicate pieces to be turned with extreme accuracy and in a minimum of actual machining time.

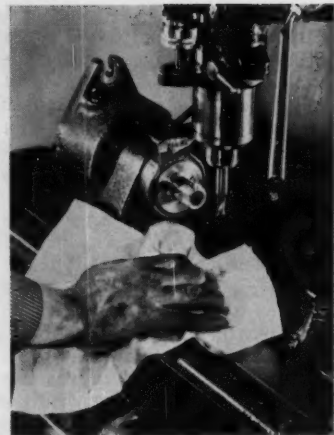
The "Air Gage Tracer" slide may be set at 30-, 45-, or 60-degree angles by means of a series of tapped holes in the ground top of the front feed-slide. The front tool-slide may be repositioned radially, again by means of tapped holes, to match the angular setting of the tracer. Upon removal of the rear slide from the platen, the entire front slide may be positioned crosswise on the platen, perpendicular to the work axis. This type of set-up is advantageous when contour facing a large diameter.

The rear slide normally is mounted on its ground base at a 90-degree angle to the work center line. The large size of the base, however, permits this slide to be positioned at any desired angle required by the particular work-piece.

Indicate Item 216 on postcard, page 325



Carboloy tool-holder with carbide pad for "throw-away" type carbide inserts. Three holders at top are for round, square, and triangular-shaped inserts



Scott industrial wiper being used to remove oil from a machine table

Scott Industrial Wiper

Navy Pier, Booth 853

A new type of disposable industrial paper wiper will be featured at the exhibit of the Scott Paper Co., Chester, Pa. Each of the wipers consists of two "Perf-Embossed" sheets "welded" together for extra durability, thus giving thorough cleaning action and maximum dirt retention. Chemical treatment provides good wet strength. The product is packaged in a compact box containing 125 wipers.

Among its many uses, the wiper is ideal for the machine shop—to clean hands, face, work-pieces, tools, or machines, as seen in the accompanying illustration. Better health protection and fewer accidents are two advantages of the all-purpose, oil-absorbent wipers. Indicate Item 217 on postcard, page 325

Carboloy Tool-Holder for "Throw-Away" Blanks

Machine Tool Show, Booth 109
Navy Pier, Booth 665

Four developments will be shown for the first time by Carboloy Department of General Electric Co., Detroit, Mich. The developments are a new machinability computer, a cemented oxide-base cutting tool which is still in laboratory stages of development, a new simplified tool-holder for throw-away carbide blanks, and a method of carbide surfacing steel parts by a new bonding process currently under appraisal

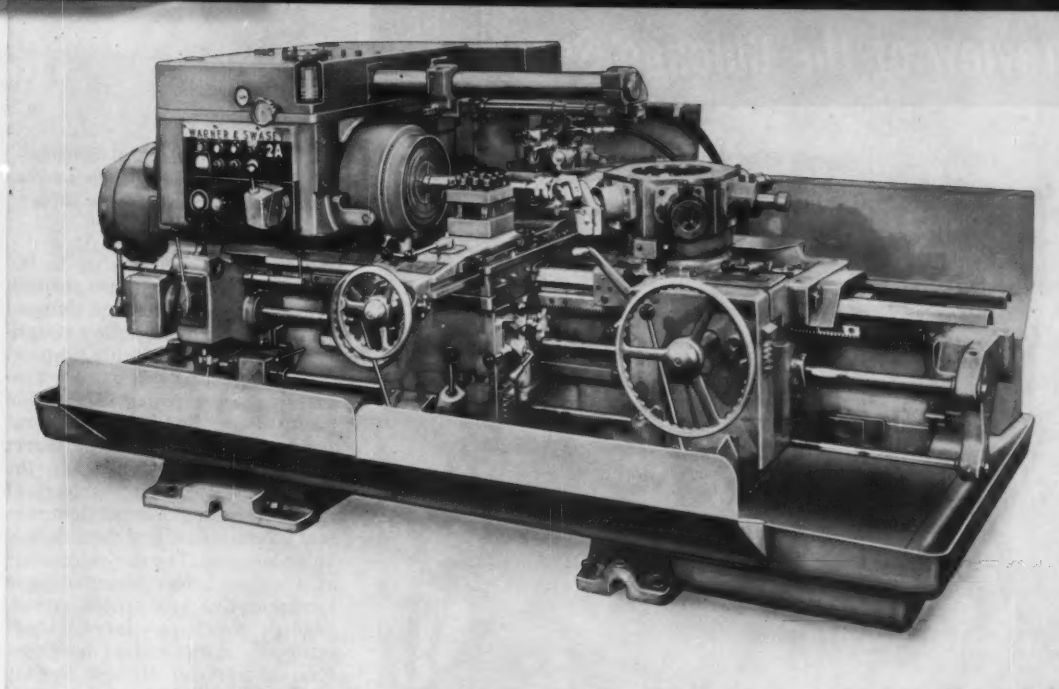


Fig. 1. A Warner & Swasey saddle type turret lathe equipped with a tracing attachment

in Carboly's research laboratory.

The tool-holder, seen in the accompanying illustration, has an indexable carbide pad for "throw-away" type carbide insert blanks, making it possible for cutting tools to operate with less overhang while providing greater rigidity. The holder design is such that chip interference, as well as any projections under the shank, are eliminated. A simple screw adjustment on top of the holder simplifies indexing the carbide cutting blank. Only a light tightening torque is required to hold the carbide insert blanks. The clamp also serves as a fixed chip-breaker to provide uniform chip control.

The new holder will be produced in five basic styles to accommodate all machining operations. Style A, for internal boring and chamfering, will also include two modified types to handle both triangular and round carbide inserts. Style B, for internal facing, turning, and chamfering, will handle 30-degree triangular and 15-degree square inserts. Style G is an offset type to handle triangular inserts for facing. Style F is for parallel turning, straddle and perpendicular facing, and recessing. It is offered in two types using both triangular and square inserts. Style D, which includes a 30-degree lead angle, is for contour turning and lead angle cutting.

New Attachments Highlight Warner & Swasey Display

Machine Tool Show, Booth 717

A new hydraulic contour tracing attachment developed by the Warner & Swasey Co., Cleveland, Ohio, will make its debut at the Show, where it will be demonstrated on a No. 2A saddle type turret lathe (Fig. 1). The tracer works from either flat or round templates, and can be used for fac-

ing as well as turning. It is mounted at a 45-degree angle on the rear of the cross-slide and functions with the machine spindle rotating in reverse.

The angle at which the attachment is mounted permits the machining of contours, tapers, and stepped diameters that increase in

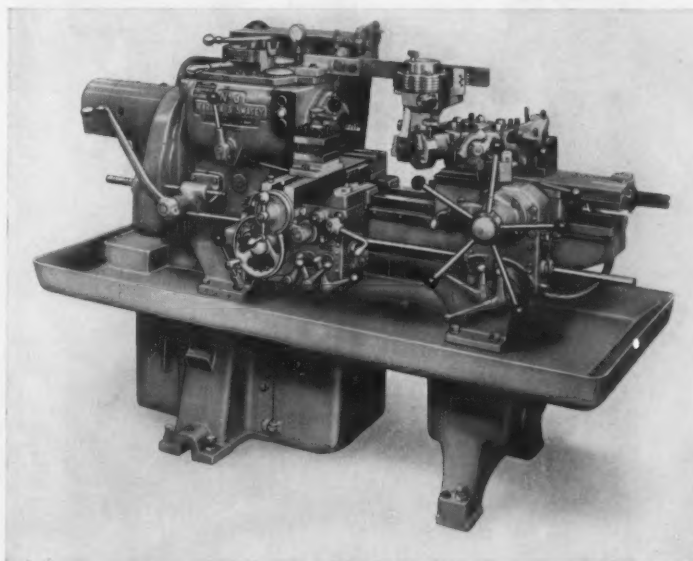


Fig. 2. Step turner set up on a ram type turret lathe

Preview of the Chicago Shows

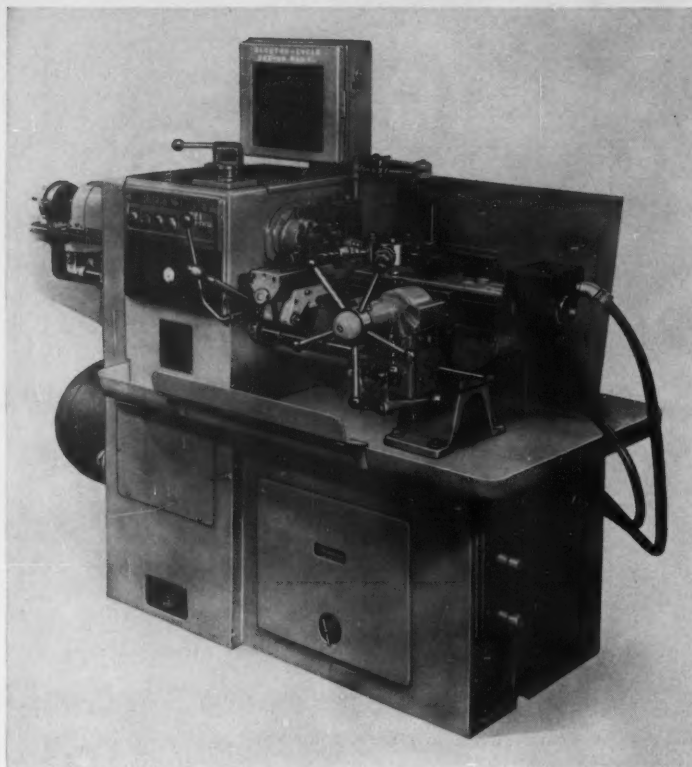


Fig. 3. A control panel automatically directs the spindle movements of the Electro-Cycle turret lathe

the direction of trace, up to 90-degree shoulders. A two-position hydraulically indexed and clamped square turret holds both a roughing cutter and a finishing cutter.

An interesting box tool for progressive step turning will be seen mounted on one of the turret faces of a No. 3 ram type turret lathe, Fig. 2. Designed for the shop that turns a variety of stepped shafts in small lots, the tool offers a fast and flexible set-up at low cost. The device consists of a cutter holder mounted on a pendulum-like arm which is suspended from a large shaft equipped with roller bearings. Four micrometer dials on the top of the tool are pre-set to control the movement of the arm through a reduction gear and rack-and-pinion.

Each dial is notched and carries roller type pawl-arms. Turned lengths are set by adjusting movable shoes clamped in slots in an overhead flat bar. The shoes trip the pawl-arms successively as the turner moves longitudinally under feed. This tripping action causes the dials to rotate counterclockwise, moving the cutter to the pre-set work diameters.

The company's No. 1 Electro-Cycle turret lathe, Fig. 3, will feature a new automatic spindle-control panel. All spindle functions—starting, stopping, reversing, and speed changes—are directed from the panel. Once the panel is properly set, only the cross-slide and turret need to be actuated during the cycling of the machine.

Another item of equipment on display is the No. 11RD dual head precision tapping and threading machine seen in Fig. 4. The heads are raised or lowered hydraulically and independently through push-buttons located on the base. Working surfaces at the top, left side, and rear of the base allow a wide variety of shapes to be handled. Positive thread lead control is obtained through precision lead-screws operating in conjunction with solenoid-actuated replaceable brass guide fingers.

Indicate Item 219 on postcard, page 325

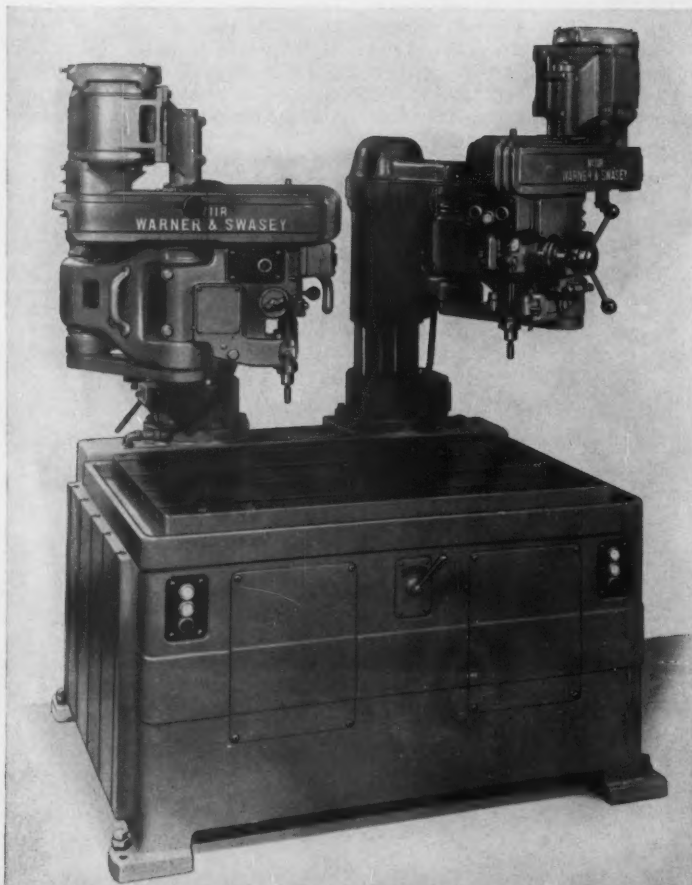


Fig. 4. Brass guide fingers hobbled directly on the lead-screws eliminate backlash in W & S tapping heads

Preview of the Chicago Shows

Barnes Drill Co. Introduces New Machines and Equipment

Machine Tool Show, Booth 818

Completely new drilling and honing machines together with recently developed equipment will be displayed for the first time by the Barnes Drill Co., Rockford, Ill. The new Barnesdril Model 64 standard hydraulic drilling machine shown in Fig. 1, for example, incorporates a self-contained hydraulic unit with two rates of feed and rapid approach. It is readily applicable to single-purpose operations with automatic cycle. With a 1500-pound thrust it has a rated capacity of 3/4 inch in steel. Feed rates range from 1 inch to 22 inches per minute. A V-belt motor drive provides a spindle speed range of from 500 to 1725 R.P.M.

The heavy-duty 7/8-inch drilling machine shown in Fig. 2, is one of four new models to be on display at the Show. This is a 7/8 UB drilling machine arranged with a four-speed geared transmission and back-gears to provide eight speeds ranging from 251 to 2900 R.P.M. V-belt drive sheaves can be selected to give a speed range from 58 to 4350 R.P.M. The other models are: 7/8 S special-purpose drill with single speed; 7/8 T tool-room drill with four-speed motor; 7/8 G semi-general purpose drill with a four-step sheave V-belt drive to provide four speeds. By adding a back-gear arrangement, dual speeds are obtained for each model.

This machine is arranged with a sliding head having a travel of 7 inches and a standard spindle stroke of 7 inches. Other features include direct-reading dial for selecting depth, and electrically controlled feed engagement.

One station of the nineteen-station transfer machine shown in Fig. 3, will be on display to show the versatility of application. A representative unit from the Barnesdril line will be demonstrated. The units in this line cover a range from fractional horsepower sizes to the 75-H.P. size.

The Model 111 honer shown in

Fig. 3. Nineteen-station transfer type machine, one station of which will be exhibited by the Barnes Drill Co.

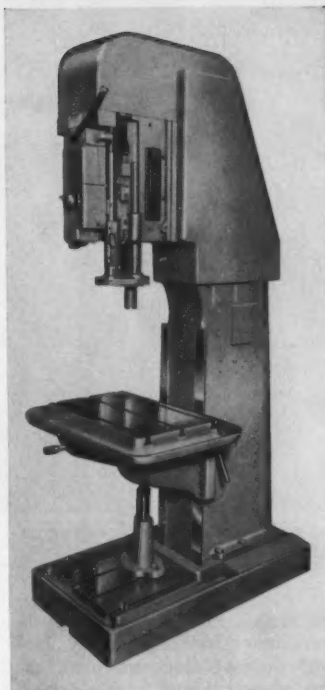


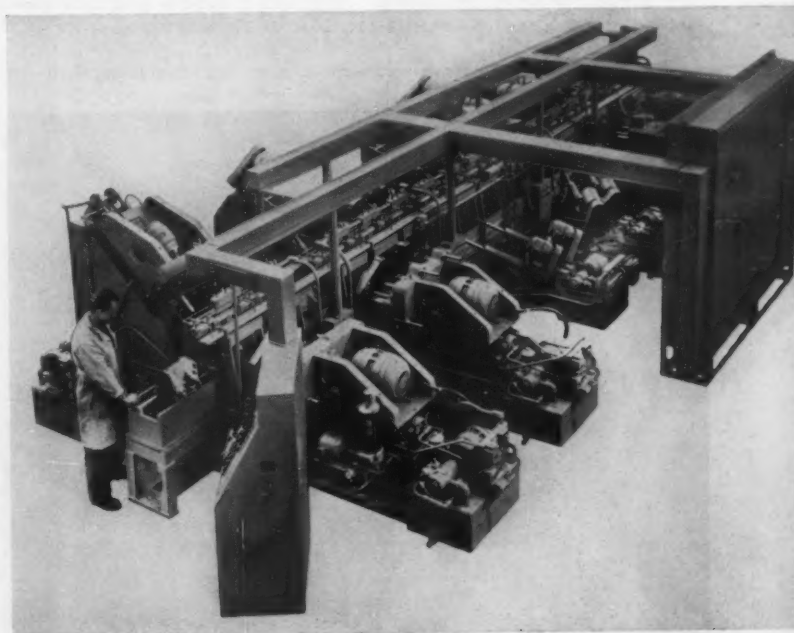
Fig. 1. Barnesdril Model 64 standard hydraulic drilling machine



Fig. 2. Heavy-duty drilling machine—one of four new Barnesdril models

Fig. 4 is a completely new machine designed for high production precision honing of surfaces up to 3 inches in length. This machine is equipped with air-electric

hone expansion, Plugmatic bore-to-bore sizing, automatic loading, gaging equipment for checking and ejecting parts mounted for the honing operation, and Barnes-



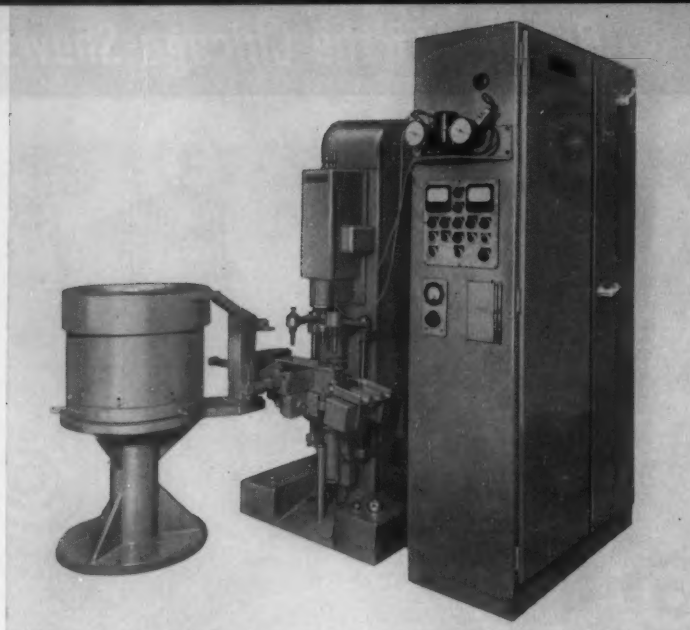


Fig. 4. Model 111 honing machine equipped with air-electric hone expansion, Plugmatic sizing, automatic loading, and precision gaging equipment

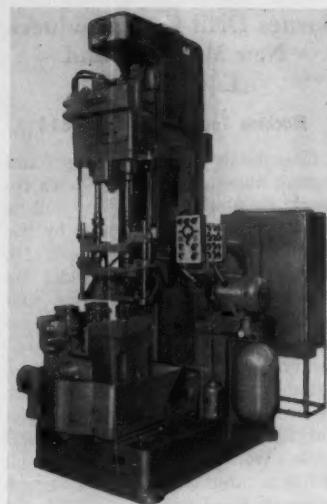


Fig. 5. Barnesdril honing machine incorporating latest developments

dril honing tools. Bores of transmission gears will be honed on a production basis during the Show.

The latest developments in the honing process—electronic hone expansion and Plugmatic bore-to-bore sizing—are incorporated in the Model 224-2 honing machine shown in Fig. 5. This unit will be set up complete with Barnesdril quick-loading honing tools using extra-deep Plas-T-Clad honing stones, fixtures, and indexing table for production honing the 2.3115-inch inside diameter by $3 \frac{5}{8}$ -

inch long bore of an aluminum alloy cylinder block. With 0.002 to 0.003 inch of stock removal, the bore is maintained within 0.0005 inch for size and geometric accuracy at a production rate of ap-

proximately 300 cylinders per hour.

Other equipment to be on exhibition includes honing tools and abrasives, magnetic and fabric filters and coolant separators.

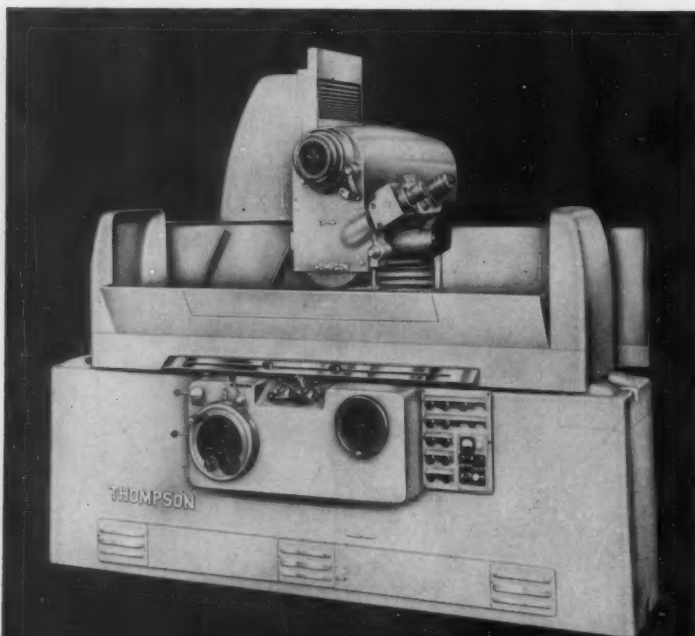
Indicate Item 220 on postcard, page 325

Thompson Introduces Six Grinders

Machine Tool Show, Booth 1407

Six new surface grinders will be exhibited by the Thompson Grinder Co., Springfield, Ohio. Shown in Fig. 1 is a Type G hydraulic sur-

Fig. 1. Hydraulic surface grinder with automatic, electric wheel-truing device



face grinder, with a horizontal spindle and cross-feeding wheelhead. The entire wheelhead and saddle assembly is mounted in anti-friction bearings and has a rapid traverse and automatic increment down feed, as well as manual pick-feed control. The machine features an electric wheel-truing device having automatic feed and compensation.

Other features include: a hardened and ground, anti-friction type, elevating screw; safety-stops that permit the traverse of the table to the end of a stroke without damage to the hydraulic mechanism or the table; and ways protected against grit and coolant. The machine takes work 12 by 16 by 36 inches.

Illustrated in Fig. 2 is a Type D hand-feed surface grinder. Both cross-feed and elevating screws are of anti-friction type. Cross-feed travel is executed by moving the wheel-head mounted in the column. Both the cross-feed and elevating units are equipped with vernier adjustments which permit accurate feeding within 0.0001 inch. The grinder also features

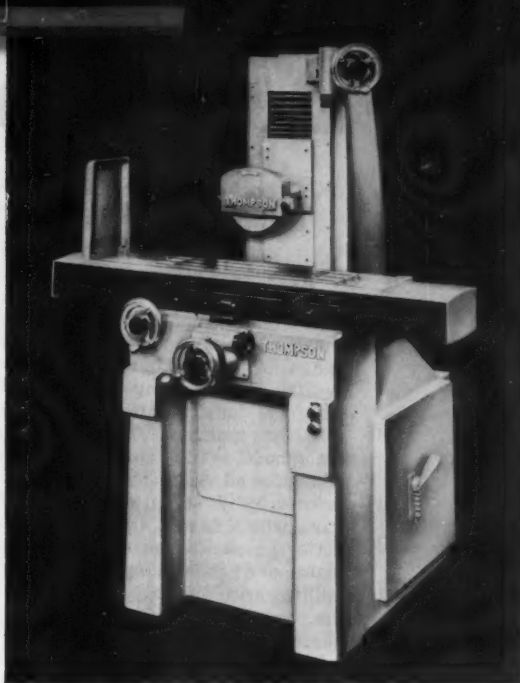


Fig. 2. Thompson hand-feed surface grinder features anti-friction construction

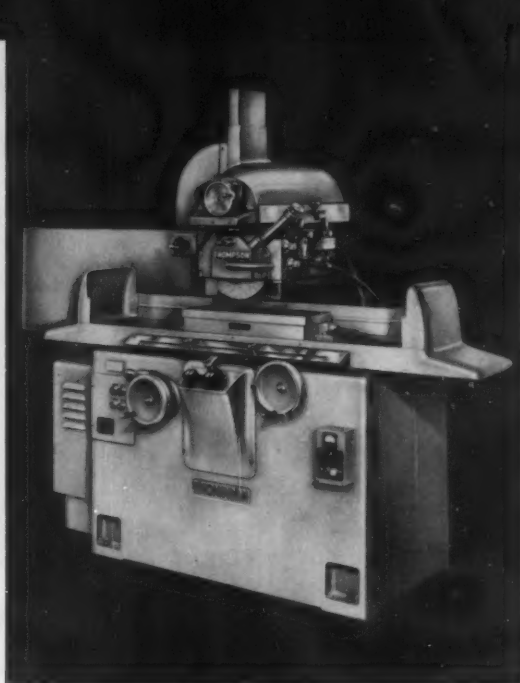


Fig. 3. A Thompson surface grinder which has a cross-feeding wheel-head

three-point leveling. Rated size is 6 by 10 by 18 inches. The grinder can be arranged for vertical spindle operation. The horizontal spindle is equipped with a 1-H.P. motor of 3600 R.P.M.

The company claims the closest approach to the sensitivity of a hand-feed surface grinder for their 8- by 10- by 24-inch Type 2F machine. This grinder, Fig. 3, is equipped with a 1 1/2-H.P., two-speed, 1800 to 3600 R.P.M. motor and has a spindle which accommodates a 12-inch diameter wheel. A cross-feeding wheel-head is featured.

The grinder to be exhibited has a new coolant system consisting of an external stream and another stream through the wheel, with either or both available in the same coolant line. It is also equipped with an anti-friction elevating nut that eliminates wind-up between the nut and screw. Grinding accuracy is guaranteed to 0.0001 inch.

Designed to eliminate the down time of loading and unloading a surface grinder, the 6-inch twin-rotary machine, shown in Fig. 4, features two work-tables with 180-degree indexing cycles. Automatic gaging that provides for complete inspection of thickness while parts are still in the grinder assures accurate and high production. A Microflex counter actuates wheel dressing and compensation after a certain number of parts have been ground.

An outstanding feature is the

setting of the cut to contact the work-piece automatically and then feed to size, spark-out, and index. The variation in cuts from one chuck to the other can be as high as 0.060 inch, and the machine will still automatically feed by rapid traverse to the work.

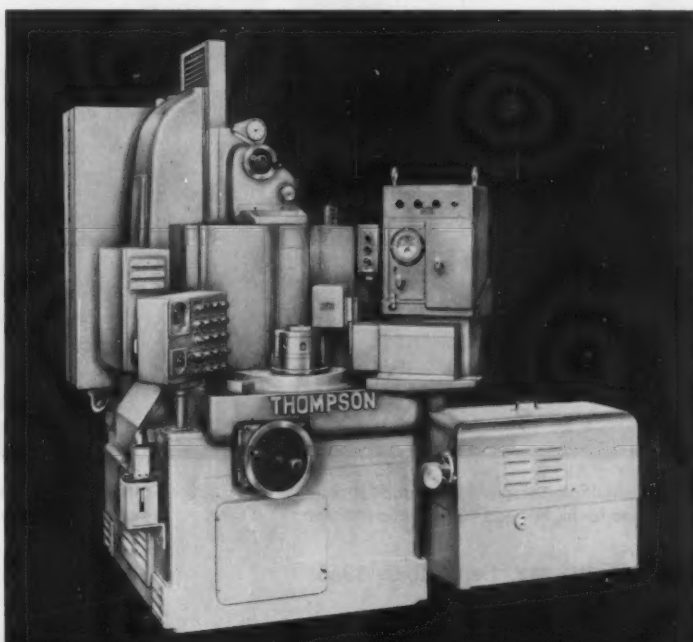
Also on view will be a Type CXV, 36- by 36- by 120-inch, double-head way grinder, which has a steel-back silver-lined bearing spindle, with integral motor drive and segmental-shoe thrust bearing. The hydraulic system is in a separate tank which is isolated

from the bed of the machine. The vertical wheel-head is powered by a 5-H.P. Adjusto-Spede unit operating from 1600 to 4800 R.P.M. and is equipped with rapid power traverse.

The Type B Truforming machine, having a rated size of 12 by 12 by 20 inches, crush grinds precision contours on a production basis. A two-roll system is used, in which a work roll for repeated crushing during grinding is utilized, as well as a reference roll for reconditioning the work roll.

Indicate Item 221 on postcard, page 325

Fig. 4. A 6-inch, twin-rotary, production surface grinder



Show Previews

Natco Multiple-Spindle Drilling and Tapping Machines

Machine Tool Show, Booth 1123

A highlight of the display by the National Automatic Tool Co., Inc., Richmond, Ind., will be a one-twelfth size, working model of a 120-foot long, Natco Holeway transfer machine. This unique scale model is fully automatic, and simulates all sixty operations performed by its actual size counterpart, which is now installed in a major automotive manufacturer's plant and is drilling, reaming, milling, core-drilling, counterboring, spot-facing, and chamfering all six sizes of approximately 106 cylinder heads per hour. Also, the machine automatically removes chips, inspects the machined castings, and rejects defective parts and replaces them with salvaged heads.

A vertical, multiple-spindle, heavy-duty drilling machine, see Fig. 1, will also be shown. This machine will be arranged with an automatic, hydraulically indexed, ro-

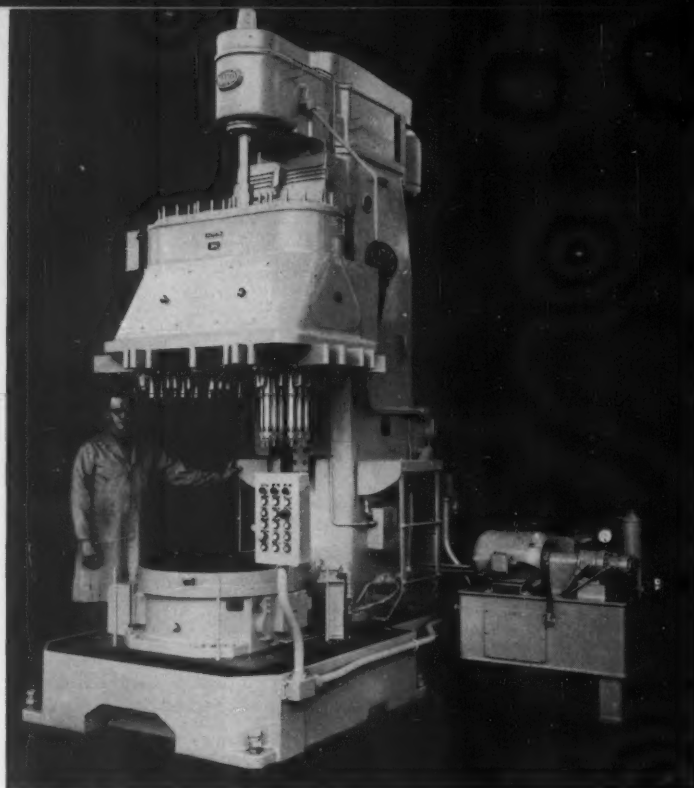


Fig. 1. Natco vertical, heavy-duty drilling machine having multiple spindles and a hydraulically indexed table

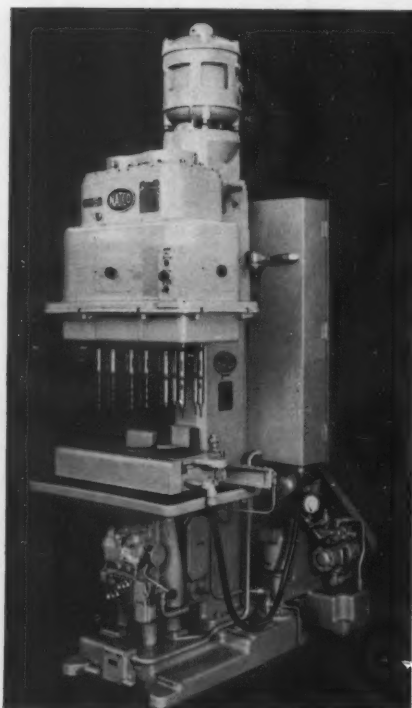


Fig. 2. Multiple-spindle drilling and tapping machine for high-speed, sensitive operations

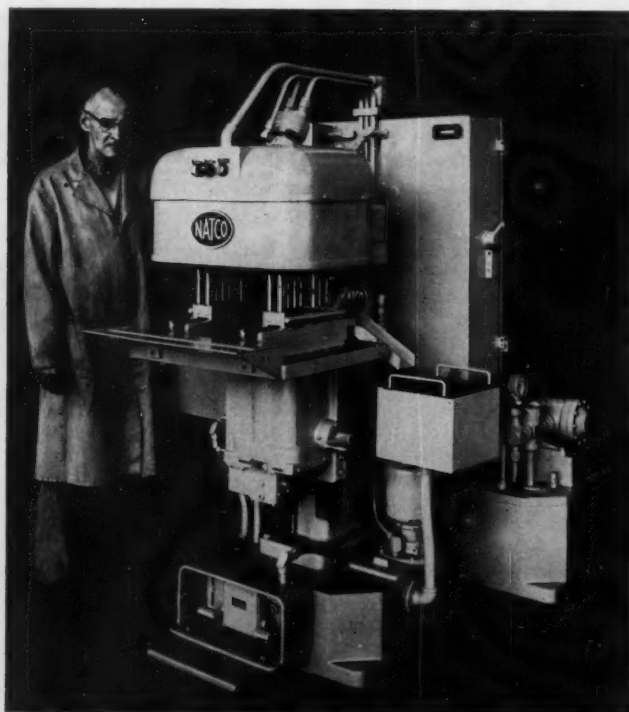


Fig. 3. Sensitive tapping operations can also be performed at high speeds on this vertical, multiple-spindle machine

Preview of the Chicago Shows

tating table. Another production unit to be shown is the vertical, multiple-spindle, high-speed, sensitive drilling and tapping machine seen in Fig. 2. The hydraulically fed table of this machine is arranged with a three-position fixture slide, interlocked with the machine for automatic drilling, chamfering, and tapping operations.

The vertical, multiple-spindle, high-speed, sensitive tapping machine shown in Fig. 3, is another display. This machine is arranged with hydraulic motor drive to the spindles, and a sensitive air-operated, table feed. Among the other units to be exhibited are a heavy-duty boring, turning, and facing machine; a special machine having horizontal, angular, and vertical sensitive units positioned around a rotating table; a mechanical feed unit; and a machine shipped in 1904. The latter machine is still being used in production, and has been secured from a customer to demonstrate it in operation at the Show.

Indicate Item 222 on postcard, page 325

Wilson Adjustable-Bed Hydraulic Gap Presses

Coliseum, Booth 114

A line of adjustable-bed, hydraulic gap presses will be presented by K. R. Wilson, Inc., Arcade, N. Y. These machines are available in 15- and 25-ton, hand-air-oil, and motor-driven models. An outstanding feature is the adjustable bed that can be quickly raised or lowered to suit small or large jobs. Bedplates are self-locking in any position by means of a device that eliminates pins, bolts, or blocks.

The hand-air-oil models have an air-oil cylinder with an internal spring return. Shop air pressure of 50 pounds per square inch will produce a ram travel of 8 inches a second. Motor-operated models have an adjustable hydraulic pressure on both downward and return strokes of the ram. A compact control and pumping unit are conveniently located on top of the press.

Indicate Item 223 on postcard, page 325

South Bend Metal-Working Equipment

Coliseum, Booth 543

A new precision vertical milling machine is to be shown for the first time by South Bend Lathe Works, South Bend, Ind. Designed for maximum convenience, this new machine, Fig. 1, is adaptable to a wide variety of exacting tool-room and production applications. The work-table is 9 inches wide and is available in lengths of either 32 or 42 inches with a longitudinal travel of either 20 or 30 inches. A 9 1/2-inch cross-feed and an 18-inch vertical feed are provided. Maximum collet capacity is 3/4 inch. A universal type head swivels 360 degrees for milling, drilling, or boring. Eight spindle speeds are available, ranging from approximately 135 to 3750 R.P.M. with a 1-H.P., 1800 R.P.M. motor, or about 90 to 2500 R.P.M. with a 3/4-H.P., 1200 R.P.M. motor.

Also to be shown for the first time is the new 13-inch precision



Adjustable-bed hydraulic gap press of a line to be exhibited by K. R. Wilson, Inc.

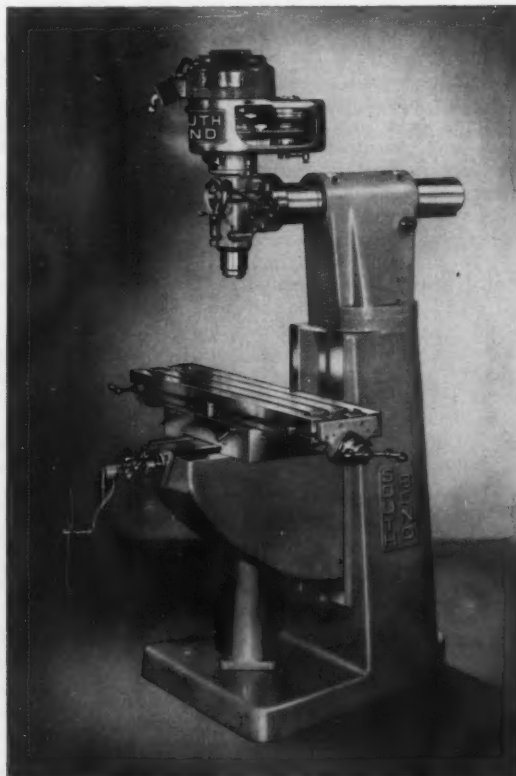


Fig. 1. Precision vertical milling machine to be exhibited by South Bend Lathe Works

Preview of the Chicago Shows

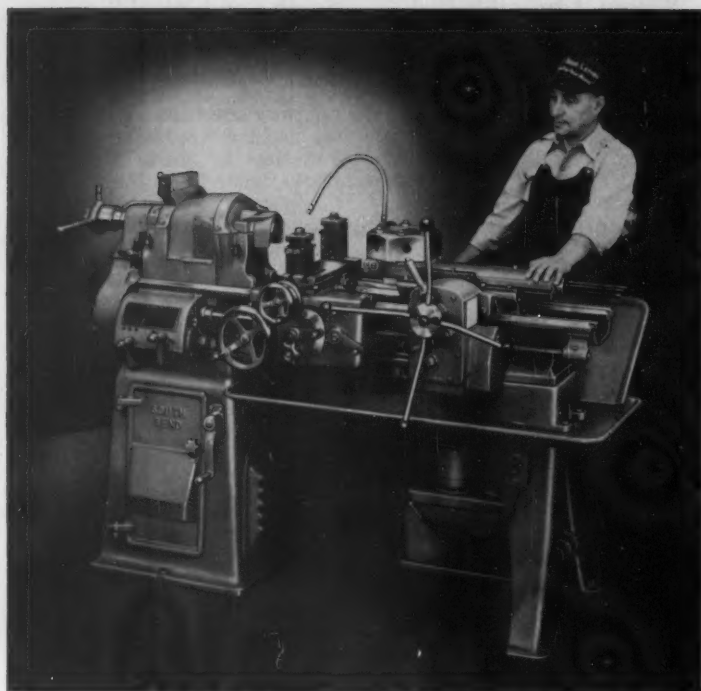


Fig. 2. Precision turret lathe provides forty-eight power longitudinal feeds.

turret lathe, Fig. 2. The lathe can be equipped with chucks or fixtures for machining castings or forgings, or with a collet attachment and pneumatic stock-feed for manufacturing parts from either bar stock or tubing. Maximum swing over the bed is 13 1/8 inches, and over the cross-slide, 3 7/16 inches. The maximum capacity through the spindle is 1 3/8-inch diameter, and the maximum collet capacity is 1-inch diameter. A universal carriage has a friction clutch for forty-eight power longitudinal feeds ranging from 0.0015 to 0.0841 inch, and also a lead-screw and split-nut for cutting forty-eight screw-thread pitches ranging from 4 to 224 threads per inch. Using a two-

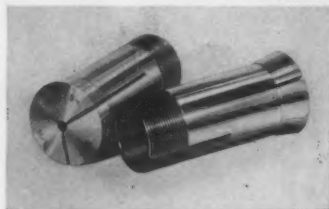


Fig. 3. "Red Arrow" line of precision collets brought out by the South Bend Lathe Works

speed motor, twelve spindle speeds are available ranging from 20 to 940 R.P.M.

A new line of precision collets having heat-treated and form-ground threads will be included in the exhibit. To be distributed under the trademark of "Red Arrow," these collets, Fig. 3, are manufactured for all current models of the company's lathes. The collets are supplied either individually or in sets.

Among the other products to be displayed are a 16-inch precision tool-room lathe, a 14-inch precision model drilling machine, a 10-inch precision tool-room bench lathe, a 9-inch self-contained precision floor lathe with a hand-lever bed turret, a 7-inch precision bench shaper, and a 10-inch pedestal tool grinder.

Indicate Item 224 on postcard, page 325

Oakite Exhibits New Materials

Navy Pier, Booth 652

A new material designed to strip zinc-chromate primer from aluminum, a recently developed acidic barrel finishing compound, and an alkaline derusting and heat scale

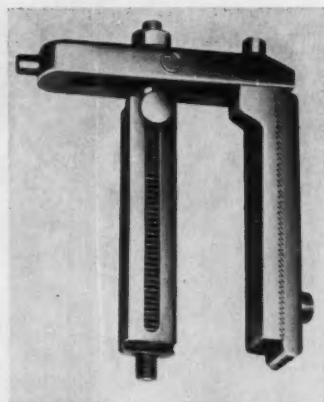
removing compound will be featured by Oakite Products, Inc., New York City, at the Production Engineering Show. Materials for tank, barrel, machine, electro, and steam cleaning; machining and grinding; pickling; rust prevention and removal; paint stripping; and paint spray booth water treatment, as well as the Oakite Cry-Coat processes for iron and zinc phosphatizing, will also be exhibited.

Indicate Item 225 on postcard, page 325

HI-LO Rapid Adjustable Clamps

Navy Pier, Booth 878

The first showing of the HI-LO rapid adjustable clamps which have a range from 7/8 to 18 1/2 inches will be made by the HI-LO Tool Products Co., Inc., Detroit, Mich. This self-contained clamp, here illustrated, features a finger-clamp that is interchangeable with a strap or gooseneck; specially designed lock screws for bolt and step block; and lower T-bolts and stud assemblies that are interchangeable. A radius on the step bar and clamp plus 1/8-inch ser-



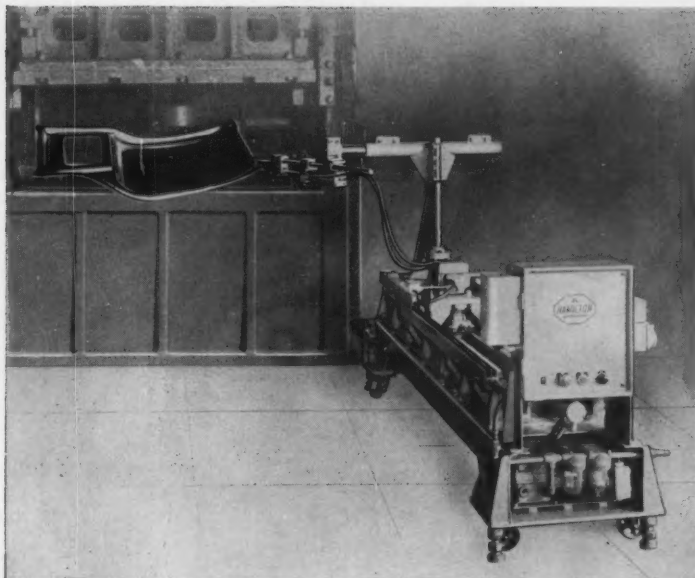
HI-LO adjustable tool-room clamp

rations for fine adjustment allow rigid clamping.

These clamps, intended primarily for tool-room set-up work, require only one-quarter of a turn for disengagement to permit adjustment. Only finger pressure is required for tightening lock screws on both bolt and step-block assemblies. The company claims that the device will not disengage under any clamping conditions.

Indicate Item 226 on postcard, page 325

Preview of the Chicago Shows



Hamilton mobile, air-operated, electrically-controlled hand for automatically unloading sheet-metal stamping presses

Hamilton Mobile Press Unloading Device

Navy Pier, Booth 810

An automation press unloading device, or hand, will be exhibited by Hamilton Automation, Inc., Hamilton, Ohio. The press hand pulls parts from the die automatically at a rate up to 30 strokes per minute. It is especially adaptable for job shops, since it is on casters and therefore easily moved. This mobility permits the automation unloading device to be moved from one press to another as production conditions require.

The press hand is operated by compressed air, and controlled by

two electric switches. In operation, the hand travels in to pull the part from the press, and then back, firmly holding the part under pressure while the entire arm support moves backward from the press on a sliding track. When the arm support reaches the end of the stroke, the hand releases the part and the support moves toward the press to again repeat the entire process. Three sizes will be available, with 24-, 36-, and 48-inch strokes, respectively.

Indicate Item 227 on postcard, page 325

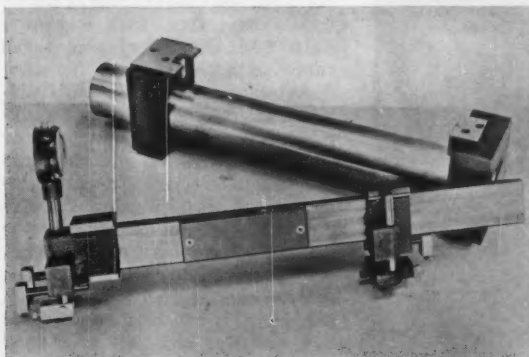


Fig. 1. Inside or outside adjustable-diameter gage introduced by the Boice Mfg. Co.

Boice Presents Adjustable Gages

Navy Pier, Booth 826

The Boice Mfg. Co., Staatsburg, N. Y., will show its new, fully adjustable, inside-outside bore gage, and a "Setmaster" for checking dial snap gages. By interchanging the inside or outside tubing center sections of the gage, Fig. 1, diameters from 6 to 48 inches can be measured. This gage is easily adjustable for measuring the diameter at any position up to 2 inches from the end of the bore and provision can be made for measuring at even greater distances.

The gage positioning buttons which rest on a work surface have an adjustment of 1 inch. A companion unit to the gage is the Model 10300 adjustable master which uses the removable center sections for work of different diameters. This adjustable master unit has hardened rest plates, a quick-adjusting anvil and a full inch of anvil surface.

The Setmaster shown in Fig. 2 can be quickly and accurately adjusted for checking a dial indicator gage at any time. The Setmaster eliminates the problem of sending gage-blocks into the shop where they are subject to wear and misuse. Since it is readily adjustable, this gage is ideal for checking master gages and for use on short-run production, receiving inspection, final inspection, and emergency tooling work. It is also useful in checking process dimensions. The gage is set by transferring dimensions from gage-blocks.

Indicate Item 228 on postcard, page 325



Fig. 2. Boice Setmaster which can be quickly adjusted for checking dial snap gages

Preview of the Chicago Shows

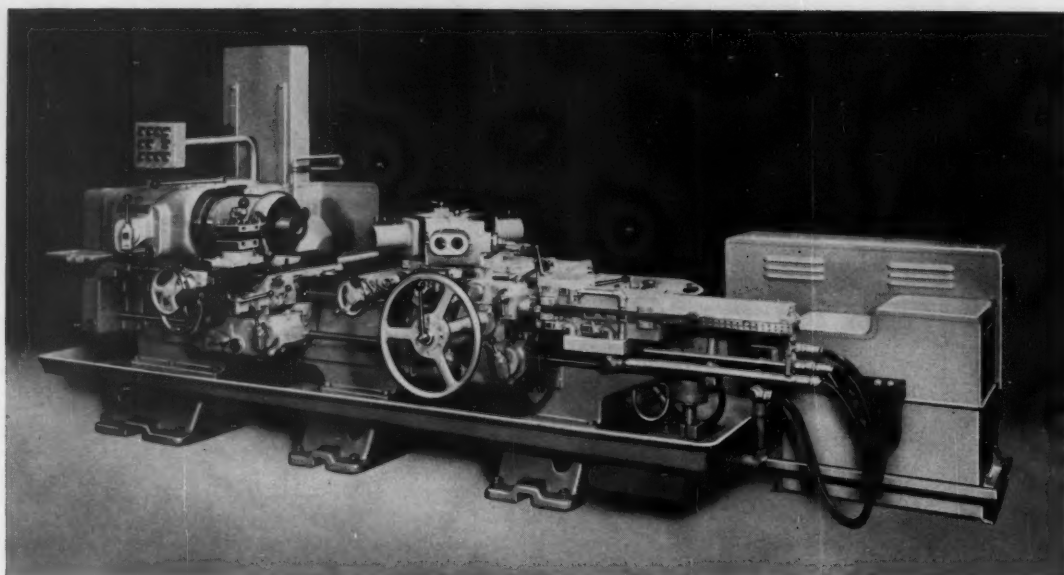


Fig. 1. Two-way hydraulic tracing from the cross-sliding hexagon turret is featured in the 3 1/2-inch saddle type Jones & Lamson turret lathe

Jones & Lamson Lathes, Optical Comparators, and Grinding Machines

Machine Tool Show, Booth 1111

A universal saddle type turret lathe, equipped for two-way hydraulic tracing, will be demonstrated by Jones & Lamson Machine Co., Springfield, Vt. Tracing mo-

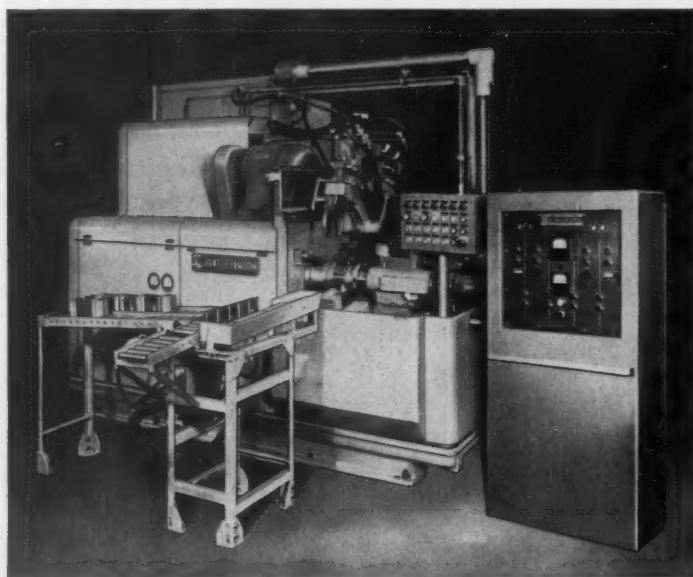
tion is accomplished by the coordinated movement of both the cross and longitudinal slides of the hexagon turret. A single stylus on this 3 1/2-inch machine con-

trols the movements of both slides. At present, the lathe, Fig. 1, is arranged to receive a flat template made to the exact shape of the work to be produced. All positions of the hexagon turret can be tracer controlled, thus permitting the use of more than one tool, tracing either conventionally or at an angle of 90 degrees.

It is possible to profile the exterior, interior, and face of a work-piece in one chucking. Other turret lathes to be exhibited include a 2 1/2-inch saddle type with automatic numerical tape control, a 4 1/2-inch saddle type having a thirty-two-speed "Hydra-Clutch" headstock and a cross-sliding turret, a 4 1/2-inch saddle type with a hydraulically operated double-angle master collet, a 6 1/2-inch saddle type with a heavy-duty 50-H.P. motor, and three ram type machines.

Automatic handling, chip disposal, gaging and sorting of work-pieces, and tool adjustment for wear compensation are features of the self-resetting Fay automatic lathe, Fig. 2. Work-pieces are handled by automatic transfer arms and are turned by a flat, disc type carbide cutting tool. The tool is automatically adjusted in two ways. It can be moved in and out radially, in steps of 0.0002 inch, through a total range of 0.002 inch. Also, it can be rotated in 100 individual steps to permit

Fig. 2. Fay 8-inch automatic lathe with feed-back control to be demonstrated at high cutting speeds



Preview of the Chicago Shows

utilization of the entire cutting-edge periphery. Two No. 40 Fay-matic lathes will also be shown.

Two new optical comparators with 14-inch screens will also be displayed. All lens systems have a 6 1/2-inch focal length to provide generous clearance in the staging area. The lenses, which are factory matched and pre-focussed, may be mounted either

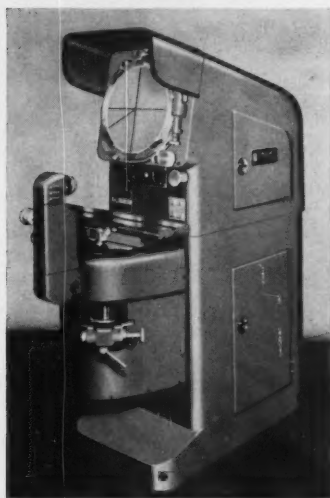


Fig. 3. Jones & Lamson optical comparator with a 14-inch screen

singly or in a six-position turret located inside the comparator. Two reflection attachments are available: one provides an acute-angle light source at each side of the projection lens for oblique illumination, and the other allows reflection inspection of deep holes, shoulders, and polished surfaces. A floor model, FC14, Fig. 3, has electronic variable-speed measuring control. This model is readily changed from a 5-inch to an 8-inch capacity by lowering or raising the work-table assembly. The cabinet base for the table model, TC-14, is designed at a convenient height for a seated operator.

Among the products to be demonstrated will be a variety of grinding machines: a form grinder, a groove grinder, and a tap grinder, all with automatic loading and unloading; an optical contour surface grinder; a 6- by 36-inch thread grinder with continuous wheel dressing; and a 12- by 45-inch thread grinder with an automatic wheel crushing device.

Indicate Item 229 on postcard, page 325

Cleereman Jig Borer and Drilling Machines

Machine Tool Show, Booth 1007

The Cleereman Machine Tool Co., Green Bay, Wis., will show production drilling machines, a jig borer, a lay-out drilling machine, and sliding-head, upright drilling machines. One model of the automatic, production type drilling machines, Fig. 1, will be used to demonstrate high-speed drilling operations, while another will be performing precision tapping "at the touch of a button."

Box-column and round-column upright, sliding-head drilling machines with improved set-up facilities, and increased spindle capacity and drive, will be operated on heavy drilling and lead-screw tapping work. A lay-out drilling machine will be demonstrated on lay-out work involving drilling, boring, tapping, and other operations.

The jig borer, Fig. 2, will be demonstrated on ultra-precision lay-outs. Boring, drilling, and tapping operations will be performed on an almost completely automatic basis. This machine is a radical departure from former designs. Work positioning is completely automatic, and does not in-

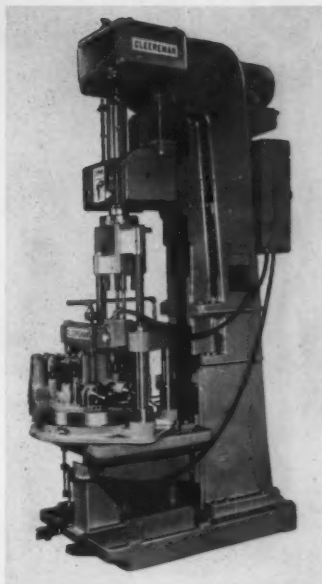
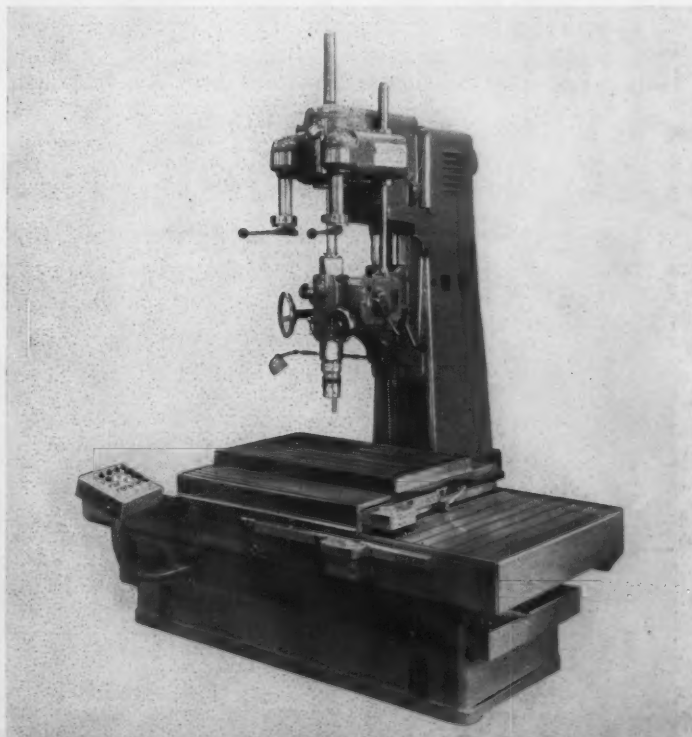


Fig. 1. Cleereman automatic, production type machine will demonstrate high-speed drilling operations.

volve any manual handling for operation of the table and saddle slides. The structural design gives 100 per cent support to heavy work throughout the machine range.

Indicate Item 230 on postcard, page 325

Fig. 2. Jig borer features completely automatic work positioning and ultra-precision table and saddle alignment.



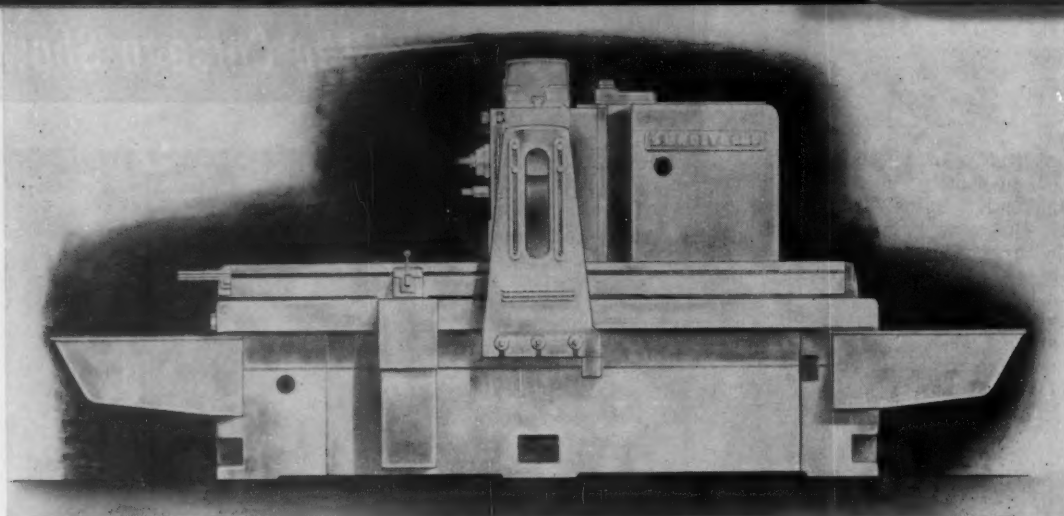


Fig. 1. Sundstrand Rigidmil with newly designed head for heavy-duty milling

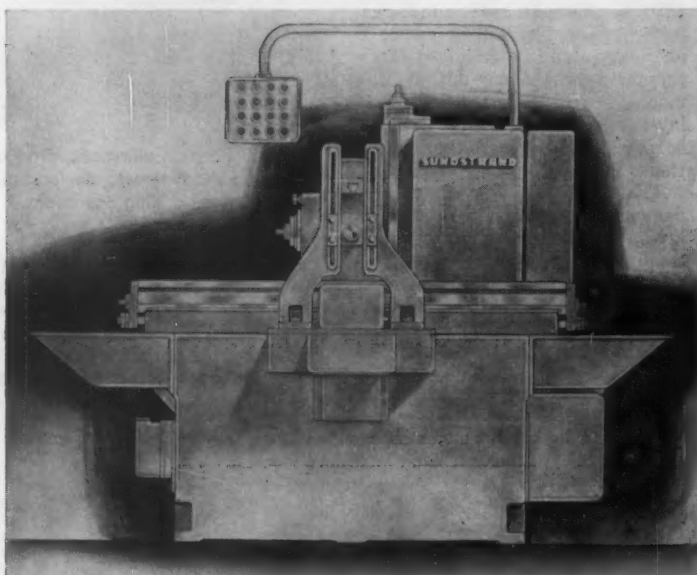


Fig. 2. Hydraulic-feed Rigidmil of 5-H.P. capacity

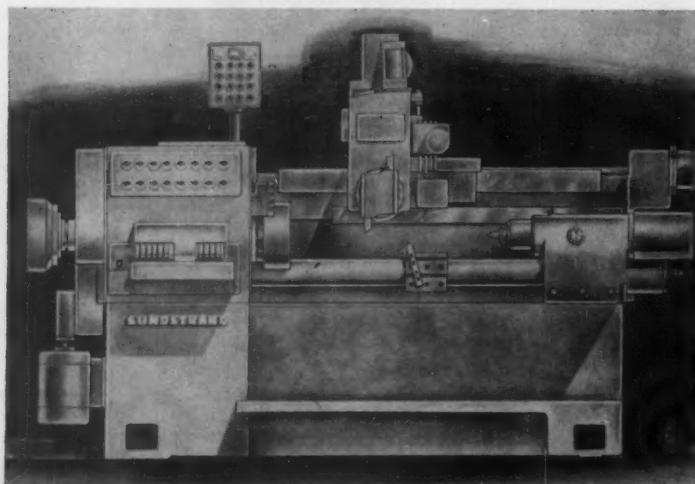


Fig. 3. Multiple-cycle lathe with two-position turret

Sundstrand Milling and Turning Equipment

Machine Tool Show, Booth 1412

Two Rigidmils and a single-point production lathe are being introduced by the Sundstrand Machine Tool Co., Rockford, Ill. The larger of the Rigidmils, Model C3 shown in Fig. 1, has a newly designed head for heavy-duty milling. The spindle, driven by a 15-H.P. motor, has a speed range from 40 to 640 R.P.M. Power feed to the table is by means of a mechanically driven screw. A backlash eliminator assures the practical application of climb milling.

Illustrated in Fig. 2 is the Model C1 Rigidmil of 5-H.P. capacity. This machine has a hydraulic feed, ranging from 1 to 100 inches per minute. Any length of combined feed and rapid traverse within the stroke limit can be obtained. Oil is also available for fixture clamping.

The spindle head is a self-contained unit with a speed range from 50 to 1500 R.P.M. It is mounted on an adjustable column for maximum cutter support.

Designed for single-point turning of shafts, Model 14 multiple-cycle production lathe shown in Fig. 3 is equipped with a two-position turret. This turret permits roughing and semi-finishing to be done with one tool, and finishing with another, all in a single automatic cycle. Shoulder facing tools, carried on the front carriage, are easily positioned and operated independently. A 40-H.P. spindle-drive motor furnishes ample speeds for carbide tools.

Indicate Item 231 on postcard, page 325

Booth 520 at the show

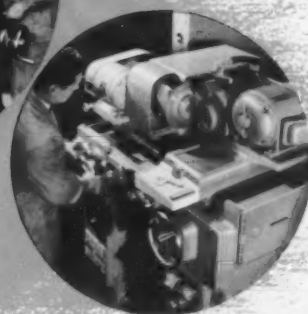
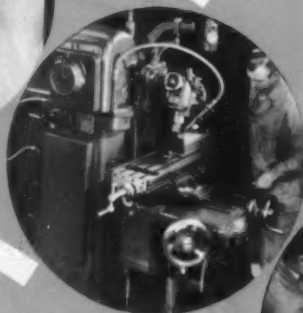
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on all fronts
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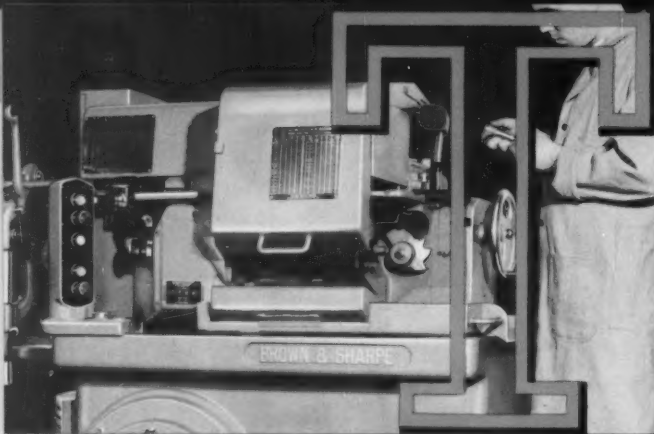
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NEW milling flexibility

NEW grinding versatility

NEW ease of precision measurement



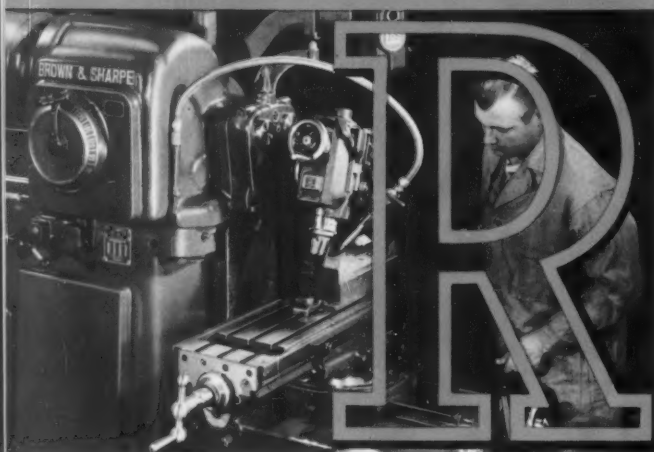


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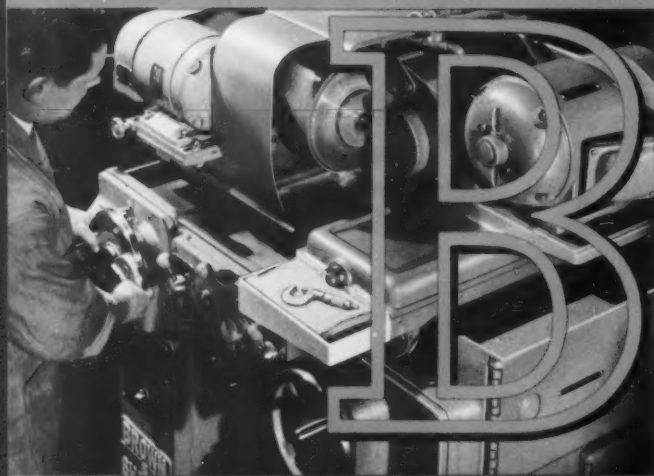


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The new Brown & Sharpe No. 00 Automatic Screw Machine. The most advanced automatic on the market for stock up to 1/2" diam.! Push-button controlled. Speed range from 7200 to 34 rpm with 208 spindle speed combinations. Turning length to 1"; up to 1 1/2" with extra equipment. Carbide tooling where desirable.

See this dynamic Brown & Sharpe advance at the Show!

Nine new 00-size Brown & Sharpe Screw Machine Tools loaded with extra-efficiency features! Illustrated Style 4 Box Tool with exclusive micrometer scale graduations is typical. All nine tools feature increased capacity to 1/2" max.; faster, easier adjustments; greater strength and durability. See this dynamic Brown & Sharpe advance at the Show!



New Brown & Sharpe No. 20 Universal Milling Machine—Sliding Head Type.

Creates a new work-range concept for a single machine! Simplest machine of its kind to set up and operate! Vertical spindle utilizes full power on all work; has 18 speed changes from 80 to 3060 rpm. Exclusive features: Quill feed and universal movement give 360° range in two planes without extra attachment. Head swings out of way on crane when idle. Both spindles on same vertical centerline. Massive 22" ways for sliding head. Sustained high-accuracy milling in any work position! Also available as No. 20 Plain Milling Machine. See this dynamic Brown & Sharpe advance at the Show!

The revolutionary collets with a far more powerful, more uniform grip than conventional spring-type collets! Steel inserts, permanently bonded to rubber, actually "tighten" their grip as power of a cut increases. Each collet has .050" range. Set of only 13 covers spindle capacity from .100" to .750"! See this dynamic Brown & Sharpe advance at the Show!


**Rubber-Flex is a trademark of the Jacobs Manufacturing Company.*



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The new Brown & Sharpe No. 11 Face Grinding Machine. A brand-new approach to grinding of flat, concave, or convex surfaces! Handles work up to 10" in diameter and 4 3/4" thickness. Horizontal work axis assures highest quality surface. Fast lever-controlled chucking. Set-diamond dressing. Pre-set grinding and dressing speeds.

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Here's the most easily-aligned, most easily-read, most durable Vernier Caliper! Jet-black, machine-cut graduations and figures on dull-chrome, recessed background give extra-vivid contrast without reflections. New Super-Vernier Plate is twice as long . . . twice as easy to read! All bearing surfaces protected by hard chrome finish. See this dynamic Brown & Sharpe advance at the Show!

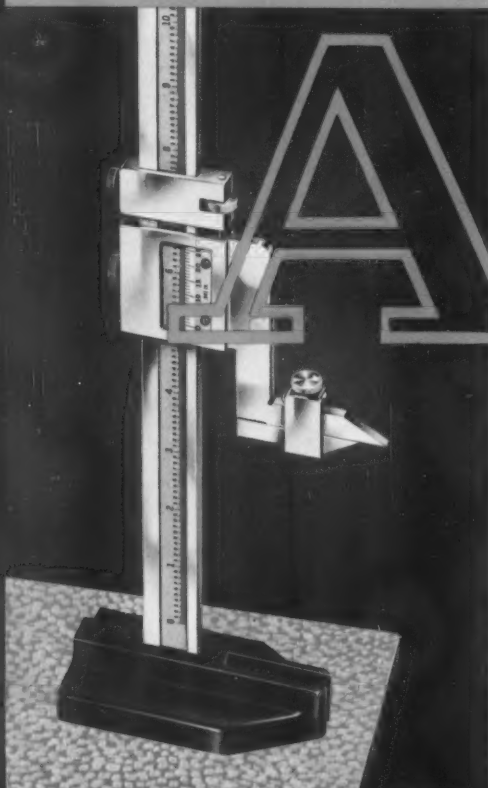


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An exclusive combination of high accuracy and ease-of-use for vertical measurement! Slotted base allows full use of scale to zero. Fixed top marker for over-surface work. For under surface, simply loosen clamp nut and slide bottom marker forward. Has Super-Vernier Plate and all the high-contrast features of the Vernier Caliper. See this dynamic Brown & Sharpe advance at the Show!

Preview of the Chicago Shows

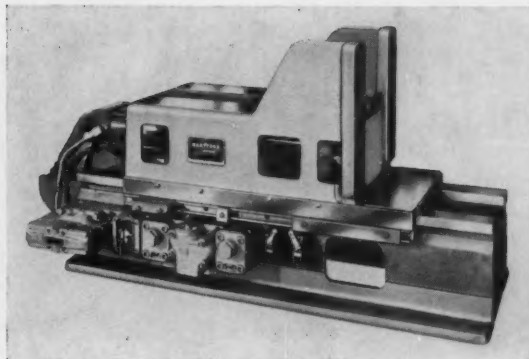


Fig. 1. Hartford way type hydraulic feed unit



Fig. 2. Automatic, self-contained, hydraulic units

Hartford Special Machinery Drilling Units

Machine Tool Show, Booth 201

Hartford Special Machinery Co., Hartford, Conn., will display the No. 405 way type hydraulic feed unit illustrated in Fig. 1. Designed to power large multiple-spindle drilling heads, it provides up to 12,000 pounds thrust. A companion unit, the No. 410, provides up to 28,000 pounds thrust. Both feature two-directional rapid traverse and infinite feed-rate adjustment. Also to be shown is the company's new line of automatic, self-contained, hydraulic drill units, Fig. 2.

Indicate Item 232 on postcard, page 325

U. S. Burke Milling Machines

Coliseum, Booth 616

Horizontal, universal, vertical, and angular milling operations can be performed on the "Quartet," a knee type machine being introduced by the U. S. Burke Machine Tool Division, Cincinnati, Ohio. A unique design of the machine is its turret and over-arm unit at the top of the column. The turret, housing the main spindle of the machine, can be swiveled and set at any point around a vertical axis.

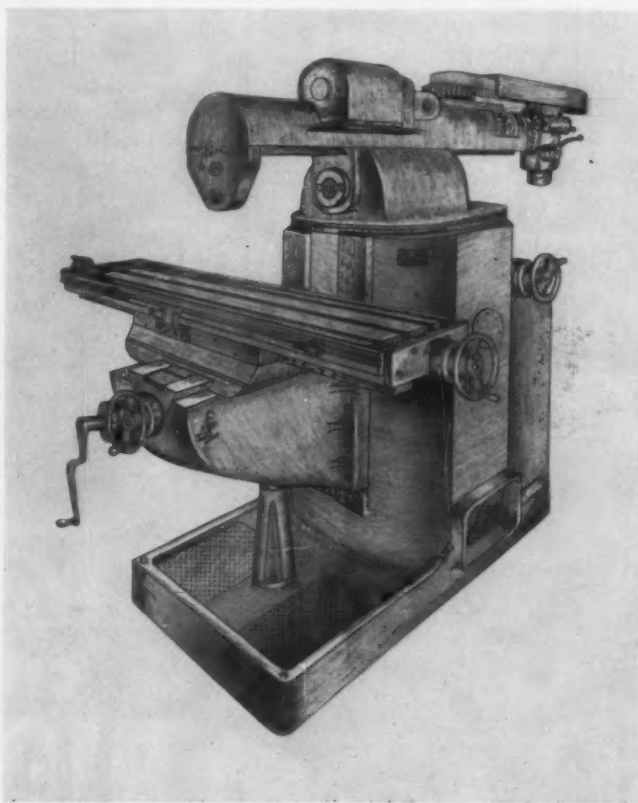
For horizontal milling, the turret is set normal to the table, as in the illustrated position. When the features of a universal machine are required, such as for milling a helix, the turret is swiveled to the appropriate angle. For vertical milling, the turret is swiveled a full 180 degrees, bringing the op-

posite end of the over-arm into operating position. This end is equipped with an independently motor-driven vertical head. To complete the flexibility of the machine, the head can be offset from the vertical for angular milling.

Cumbersome or heavy work outside the capacity of the table can be supported in a fixture on the floor at one side of the machine and milled with either the hori-

zontal or the vertical spindle. The horizontal spindle is driven by a 3-H.P. motor, and provides infinitely variable speeds. At low speeds, the drive is through a massive 12-inch gear. At high speeds, the gearing is disengaged, and the spindle drive is through vibration-free timing belts, with the heavy, low gear acting as a flywheel.

Indicate Item 233 on postcard, page 325



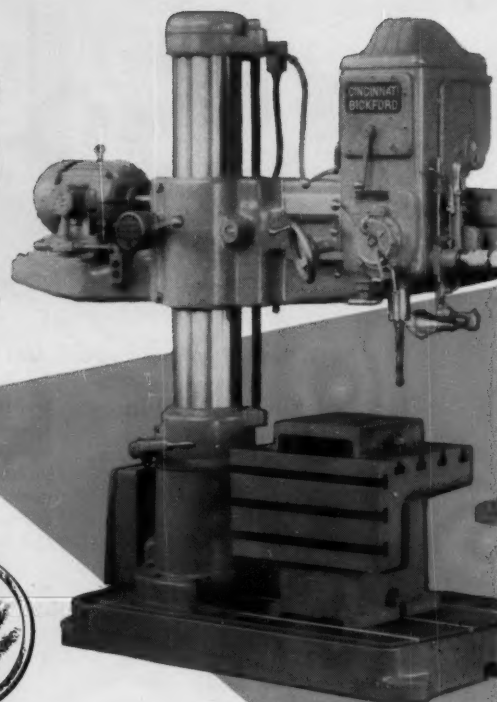
"Quartet" knee type milling machine features a swiveling turret

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SUPER SERVICE
DRILLING MACHINES

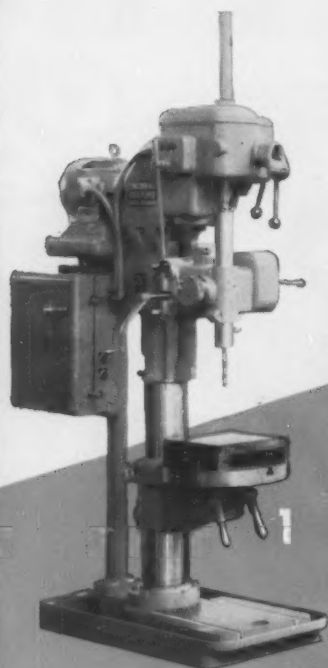
in Action

BOOTH 901

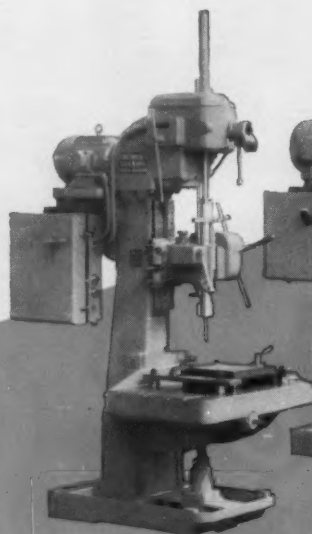
THE
MACHINE TOOL
SHOW
CHICAGO, ILL.
SEPT. 6-17, 1955
INTERNATIONAL AMPHITHEATRE



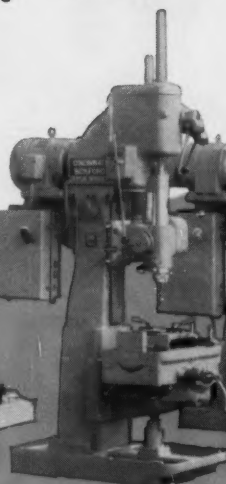
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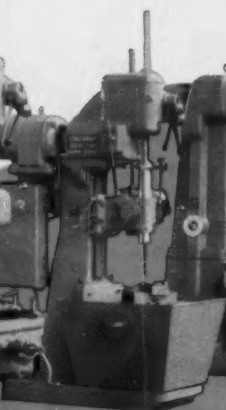
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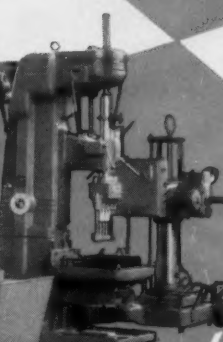
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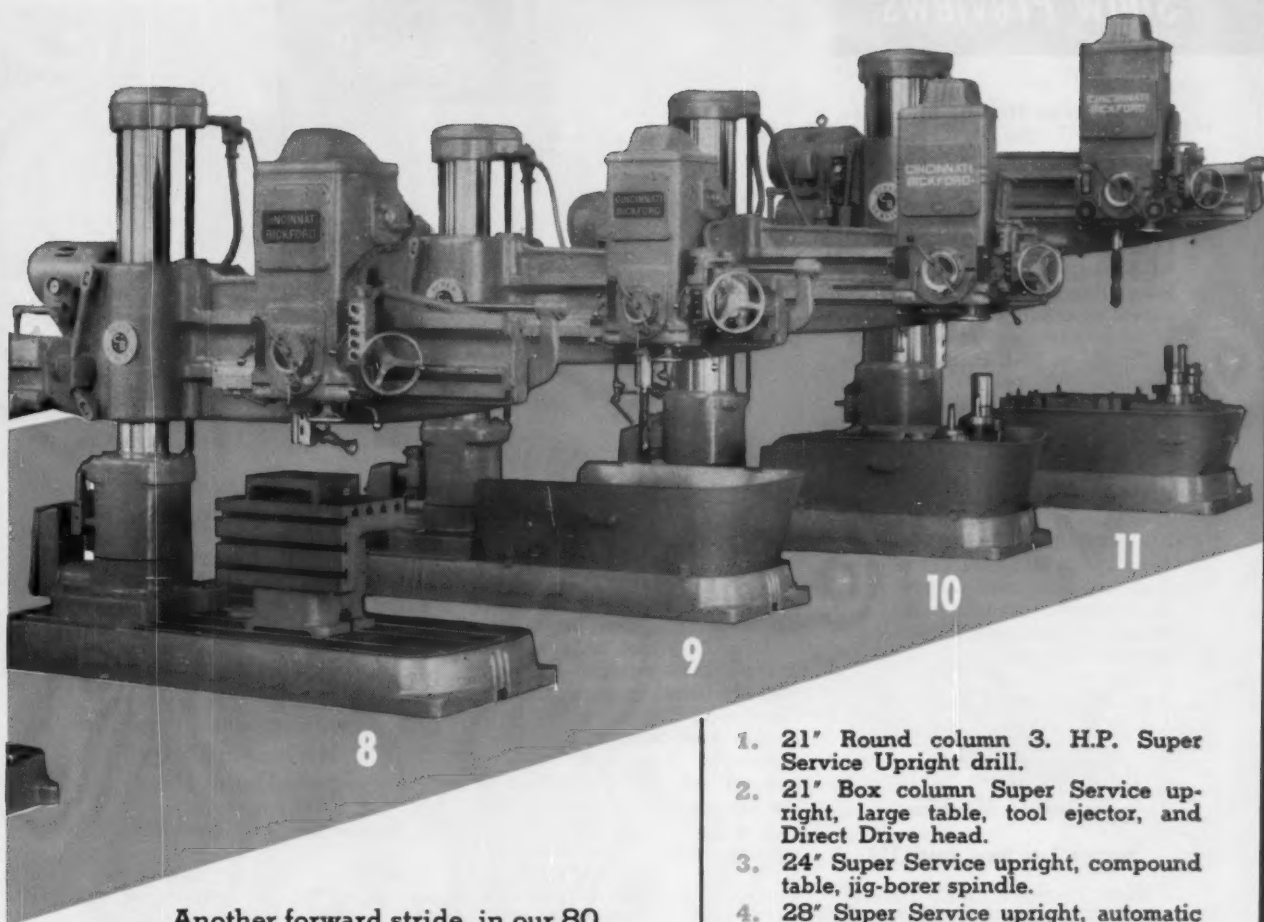
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6

80 YEARS OF SERVICE

CINCINNATI
BICKFORD



Another forward stride, in our 80 years of drilling machine development, is today's introduction of the new hydraulic pre-selector for all speeds and feeds on Super Service radial drills.

See it . . . and the startlingly simple prescheduling arrangement.

See the new 12 speed head Super Service radial with 9" diameter column, or 11" column and 5 or 7½ H.P.

See new cost cutting features on Super Service Upright drills . . . 11 machines in operation at Booth 901.

1. 21' Round column 3. H.P. Super Service Upright drill.
2. 21' Box column Super Service upright, large table, tool ejector, and Direct Drive head.
3. 24' Super Service upright, compound table, jig-borer spindle.
4. 28" Super Service upright, automatic electrical tapping reverse.
5. 28" Direct Drive upright, flanged quill, drill head.
6. Portable horizontal drill, 1½ H.P., 6 speeds.
7. 3' arm 9" column high speed Super Service Radial, automatic tapping reverse, 9 speeds, 4 feeds, 3 H.P.
8. New 4' arm 9" column Super Service Radial, 12 speeds, 6 feeds, 5 H.P.
9. New 4' arm 11" column Super Service Radial, power head traverse, 12 speeds, 6 feeds, 7½ H.P.
10. New 5' arm 15" column Super Service Radial featuring hydraulic speed range preselector, 36 speeds, 18 feeds.
11. New 6' arm 19" column Super Service Radial, hydraulic 100% preselection of 36 speeds and 18 feeds . . . and a unique prescheduling device.



RADIAL AND UPRIGHT DRILLING MACHINES

THE CINCINNATI BICKFORD TOOL CO.

Cincinnati 9, Ohio, U.S.A.

Show Previews

Kent-Owens Milling Machine

Machine Tool Show, Booth 1218

The No. 3-36 hydraulic milling machine seen in the accompanying illustration will be demonstrated by Kent-Owens Machine Co., Toledo, Ohio. This machine is designed especially for rapid milling of large work, and is powered by a 7 1/2- or 10-H.P. motor drive through the spindle. A speed range of 25 to 1050 R.P.M. is provided.

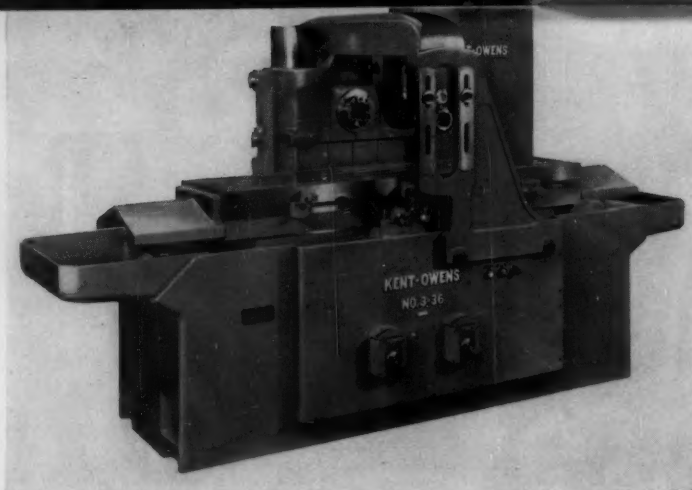
The 16- by 64-inch table of the machine has a 36-inch travel with fully automatic cycle. Rapid traverse rate is 300 inches per minute, and the table may be fed from 1/2 to 60 inches per minute. Separate rate controls are provided for independent feed travel in either direction. Attachments are available for accurate depth milling with positive stop and dwell, in one or two directions.

Indicate Item 234 on postcard, page 325

Reid Precision Surface Grinding Machine

Machine Tool Show, Booth 108

Reid Brothers, Inc., Beverly, Mass., will exhibit a new line of 6- by 18-inch precision surface grinding machines. Model 618-PF



Hydraulic milling machine to be demonstrated by Kent-Owens Machine Co.

is fully electrically powered and designed for finger-tip operational control from a panel. The dial-controlled table speed is infinitely variable from zero to 70 feet per minute. Table reversal is accomplished without reversing the driving motor. The cross-feed drive is dial controlled and infinitely adjustable from 0.001 to 7/32 inch. A selector switch controls the cross-feed at either or both ends of the table travel. The power rapid traverse of the cross-feed, rapid power elevating head, and automatic cycle of the cross-feed are all push-button controlled.

In addition to the fully powered machine, there will be a Model

618-PT, which incorporates a power-driven table with a hand-driven cross-feed. There will also be a Model 618-HF machine with a hand-driven table and cross-feed.

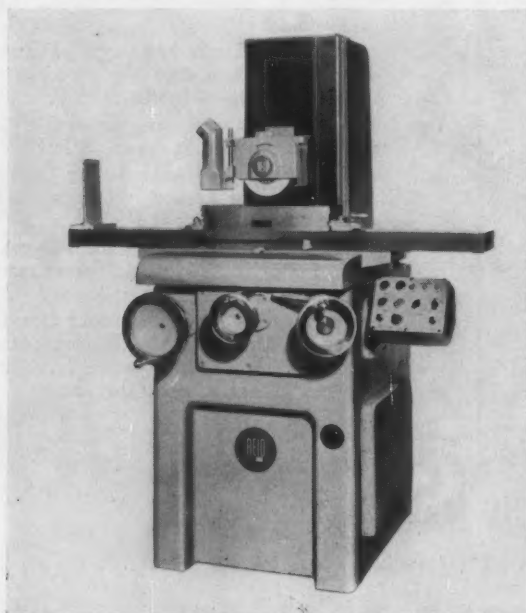
Indicate Item 235 on postcard, page 325

Van Norman Ram Type Milling Machine with Quill Adjustable Cutter-Head

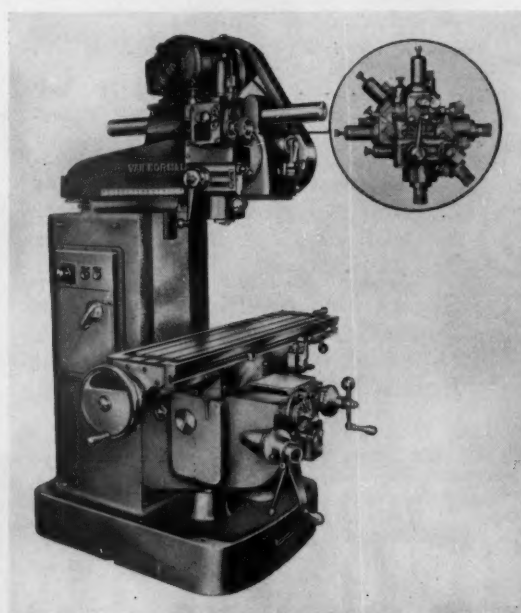
Machine Tool Show, Booth 905

Horizontal, angular, and vertical milling cuts, as well as boring and drilling operations, can be performed without attachments

(Continued on page 316)



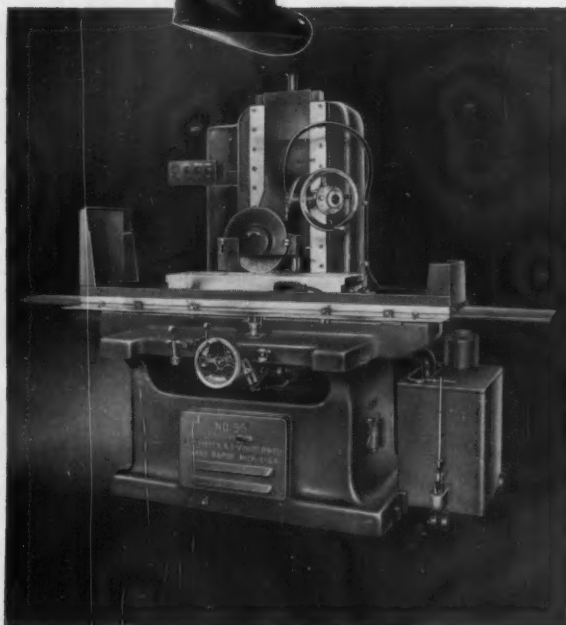
Reid fully powered precision surface grinding machine



Ram type milling machine with quill adjustable cutter-head

FOUND WHERE WORLD FAMOUS AIRCRAFT ARE "BORN"

GRAND RAPIDS GRINDERS



GRAND RAPIDS NO. 55 HYDRAULIC FEED SURFACE GRINDER
This precision tool room type machine has table speed up to 125 fpm. Working surface of table is 12" x 36". Vertical movement of wheel head 18". Preloaded ball bearing spindle greased for life. Spindle speeds 1925 and 2500 rpm.



Just a note on your letterhead will bring you full details.

Just take a look in their toolrooms! Every one of these famous aircraft manufacturers uses Grand Rapids Grinders . . . depends on them for the uncompromising precision on which records and reputations are made.

Grand Rapids Grinders are engineered and built for unusual long life of precision grinding. Our Model 55 shown here, for instance, features column and base of massive, one-piece casting for vibrationless rigidity and permanent alignment. Both longitudinal table travel and cross feed are hydraulically actuated. Wheel head has powered rapid vertical travel. Table speed is variable up to 125 fpm . . . faster than any other of this type and size.

That's why so many tool room men insist on Grand Rapids Grinders.



BEECH



BELL



BOEING



CHANCE VUGHT



DOUGLAS



GRUMMAN



LOCKHEED



MARTIN



MCDONNELL



NORTHROP



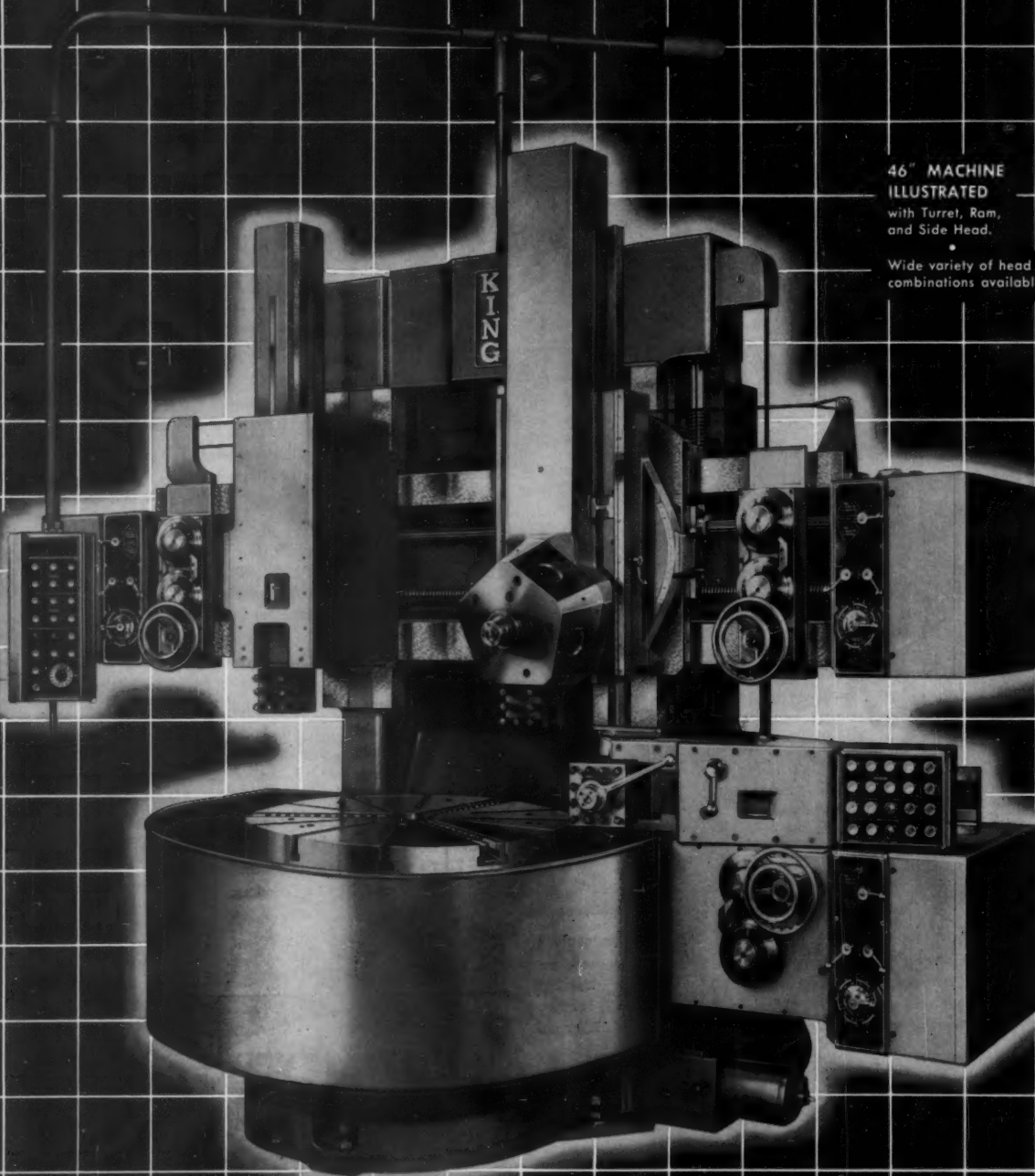
REPUBLIC

GALLMEYER & LIVINGSTON COMPANY 305 Straight Ave., S.W., Grand Rapids, Michigan

KING

46" MACHINE
ILLUSTRATED
with Turret, Ram,
and Side Head.

Wide variety of head
combinations available.



KING VERTICAL BORING AND

KING

CA

Here's the

ALL NEW

KING

**VERTICAL
BORING and
TURNING
MACHINE**

Completely Re-designed for:

- ★ higher productivity...
- ★ greater accuracy...
- ★ ease of control...
- ★ simplified maintenance



See the new KING under power operation
at BOOTH No. 1121

TURNING MACHINES

These new KING® machines—the result of long, intensive research and development—will bring to boring mill users the greatest productive capacity thus far achieved for vertical boring and turning work! Here are a few of the many advanced features:

INCREASED HORSEPOWER

40 to 50 h.p. on 30" to 46" sizes. 75 to 100 h.p. on sizes 56" and up.

EXPANDED FEED & SPEED RANGES

24 feeds available. 24 speeds arranged in geometric progression in any of three standard ranges.

FULL ELECTRIC CONTROL

All controls arranged for maximum operator convenience. Those most frequently used are pendant located; all others are on a fixed control station on the side head. Pendant controls include automatic pre-selective speed selector dial, speed change pushbutton, and directional pushbutton control of all head movements.

POWER SWIVELING OF RAIL HEADS

Power swiveling is pushbutton controlled from pendant and may be done at rapid traverse or feed rate.

POWER INDEXING (Optional)

Both the rail head turret and the side head tool block may be arranged for power operation controlled from the pendant.

POWER RAIL CLAMPING (Optional)

With this feature, power clamping of the rail is electrically interlocked with pushbutton-operated rail positioning.

AUTOMATIC LUBRICATION OF ALL MOVING PARTS

This feature eliminates manual operation of lubricating pumps.

New model King machines belong in your increased productivity plans. Obtain the complete story on the amazing productive capacity of these new Kings by filling out and mailing the coupon below.

SEND NOW FOR NEW CATALOG

American Steel Foundries,
King Machine Tool Division
1162 Tennessee Avenue, Cincinnati 29, Ohio

Please send Catalog K-5 illustrating and describing new model KING Vertical Boring & Turning Machines.

*Catalog K-5 covers 30", 36", and 46" machines.
Catalogs on larger sizes will be available later.*

Name _____ Title _____

Company _____

Address _____

City _____ Zone _____ State _____

Preview of the Chicago Shows

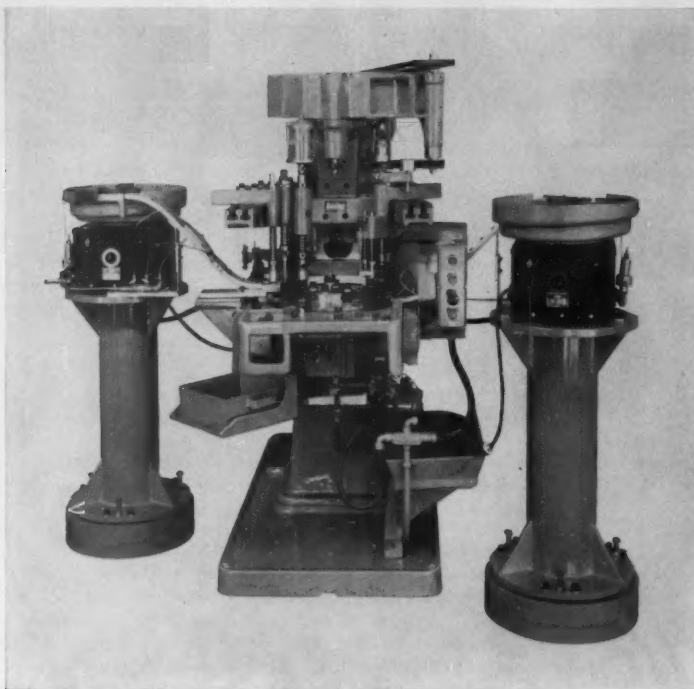


Fig. 1. Bodine dial type automatic multiple-spindle machine performing several operations on battery filler caps, including assembly of two cap components

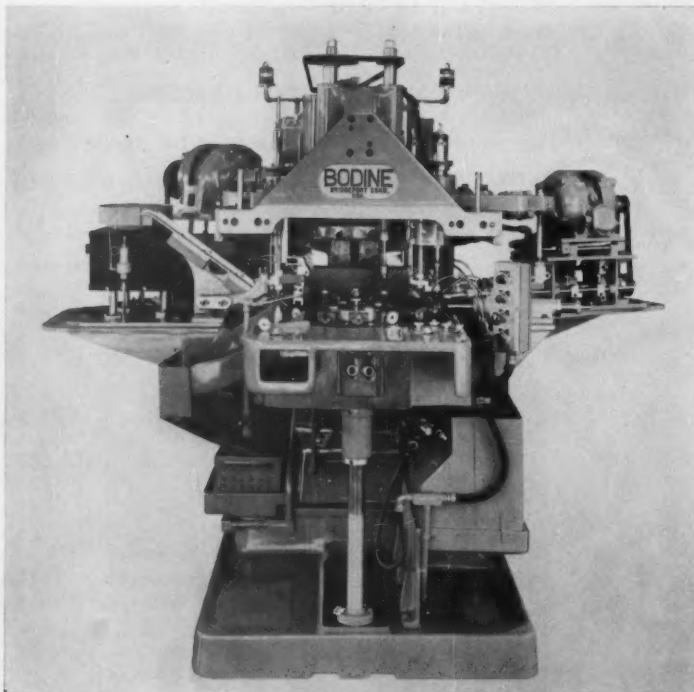


Fig. 2. Another Bodine machine of hand-fed, dial type which performs a series of operations on die-cast hanger brackets

on a No. 16S ram type milling machine that will be exhibited by the Van Norman Co., Springfield, Mass. This machine is designed for maximum rigidity, cutting performance, and accuracy. It is intended for use in the tool-room, machine and pattern shops, and on production lines.

The adjustable cutter-head has 4 inches of quill travel; three power feeds of 0.005, 0.003, and 0.006 inch, respectively; and eight spindle speeds from 110 to 3600 R.P.M. The cutter-head spindle is equipped with a 2-H.P. motor. The table dimensions are 40 1/2 by 10 inches, and the table has a power travel of 22 inches. There is a cross-feed of 10 inches and a hand vertical feed of 22 inches. The ram movement in and out above the column is 20 1/2 inches.

Indicate Item 236 on postcard, page 325

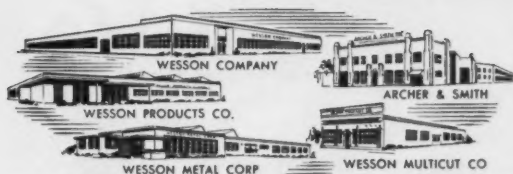
Bodine Dial Type Automatic Multiple-Spindle Machines

Machine Tool Show, Booth 209

Two dial type, automatic, multiple-spindle machines, one a Model 41-20 size and the other a Model 42-30 size, will be featured by the Bodine Corporation, Bridgeport, Conn. The first one mentioned, which is the smaller of the two, has been built for the automatic assembly of plastic filler caps for storage batteries. This machine is equipped with two vibrating type hoppers, as shown in Fig. 1, for feeding the upper and lower members of the filler cap to an automatically indexed dial. The machine has a drill spindle to remove any molding flash in a vent hole of the bottom plug component. An attachment coats the lower part of the plug with a quick-drying adhesive and at the final station, the top half of the plug is fed into position and pressed on the bottom part. Thirty pieces are assembled per minute.

The larger machine, which is illustrated in Fig. 2, will be tooled up for operations on a die-cast hanger bracket. The die-cast components are hand loaded on the automatically indexed dial and then proceed through a series of tapping, drilling, countersinking, and burr removing operations. At the last station, a set-screw fed from a hopper is inserted into a hole. Twenty pieces are handled per minute.

Indicate Item 237 on postcard, page 325



carbide NEWS

26 Outperforms Other Carbides 8:1

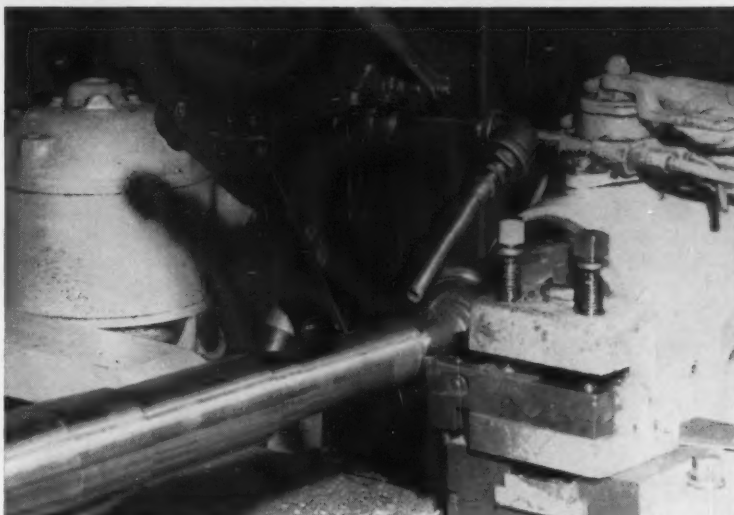
Boosts sprocket shaft output from 15 to 120 pieces per grind

In a series of production comparison tests, Grade 26 again came out on top—this time in machining forged steel (Rockwell 44) tractor sprocket shafts at a large midwestern tractor company.

With Wessonmetal 26, output averaged 120 pieces per grind as compared with 15 pieces per grind for all other steel cutting grades tested.

The operation is performed on a new 20" Monarch Air Gage Tracer lathe and consists of finish turning the shaft diameter, forming radii and chamfers, and rough turning all other diameters. Length of travel in the cut is 18 1/4"; speed 375 sfpm; feed range from .009 to .012". Average depth of cut for all diameters is 1/4-inch.

Primary reason for the big increase in life achieved with Wessonmetal 26 is its ability to stand up under widely varying conditions. Inserts made of other carbides shattered or broke after 12 to



15 pieces on one cutting edge and could not be indexed. This trouble was eliminated with Grade 26, which averaged 20 pieces per edge and could be indexed to give a total of 120 pieces per grind.

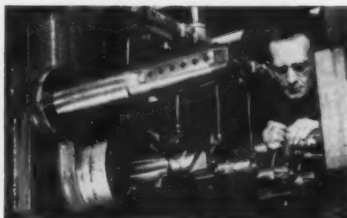
Worthy of note also is that the performance of Wessonmetal 26 (a "nearly universal" steel cutting grade) was achieved in comparison even with carbides of a specialized nature specifically selected for this operation.

New Film Points Way To Better Tooling

One of the most dramatic technical sound films yet produced is now released by the Wesson Company for showings to technical and shop groups.

Built around the development of tooling for an actual job—the machining of tractor track links—the 16 mm. technicolor sound film—which took two years to complete—records the *failures* as well as the successes achieved. The trials and tribulations encountered will remind many of their own experiences.

Entitled "Tools of Abundance," the film tells how a large manufacturing com-



mittee working with Wesson tool engineers carried a specific job through to completion. It is the story of how cooperation helps to develop and improve American manufacturing methods.

This story of teamwork—supplemented by about a dozen other general machining and high production operations in the film—provides a rational approach to solving other difficult tooling problems. For a showing to YOUR company, write for the film on your company letterhead. A Wesson man will bring it to you.



WESSON COMPANY
DEPT. AD
1220 Woodward Heights Blvd.
Detroit 20, Michigan

Tool Hints

If you have an idea that you would like to get better tool life on a job than you are getting, do these things and you may find you were right:

1. Check for vibration and chatter and eliminate all you can. Both are deadly to tool life.
2. Check whether the rake angles are correctly ground. There is a best combination for any job.
3. Check whether you have the ideal combination of speed and feed.
4. Check whether tools are changed before they get too dull. Dull tools wear faster than sharp ones. Keeping them at work is false economy.
5. Check tool after each sharpening against the tool PRINT. This is excellent insurance.

None of these suggestions are new. But they are still keys to better tool performance.

(P.S.—A sixth method is to call in a Wesson man)

Preview of the Chicago Shows

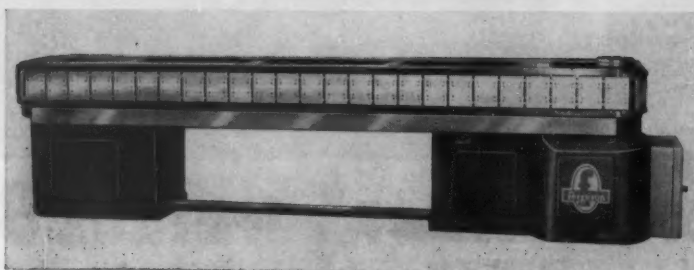


Fig. 1. Ferguson straight-line machine having forty stations for manufacturing and assembling small parts

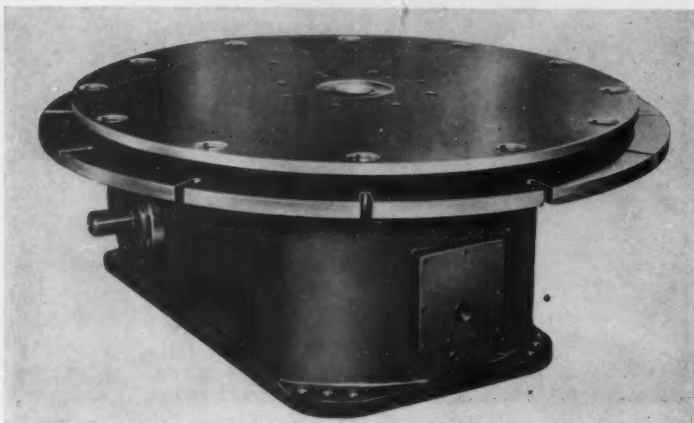


Fig. 2. "Intermittor" precision index-table is capable of production rates as high as 30,000 pieces per hour

Ferguson Straight-Line Machine and Indexing Devices

Navy Pier, Booth 852

A standard, straight-line machine, Fig. 1, for manufacturing and assembling small parts will be shown by Ferguson Machine & Tool Co., Inc., Roller Gear Division, St. Louis, Mo. Called the "Trans-O-Mator," this machine is equipped with a complete power transmission unit, an electrical interlock system, and controls. The standard unit has forty stations, a 6-inch stroke, and attains production rates up to 6000 per hour.

Also to be shown is an "Intermittor"—a standard precision index-table for high-speed production—attaining production rates as high as 30,000 pieces per hour. There are more than 150 standard tables in the line, available with stops ranging from four to thirty-six, and dial sizes varying from 12 to 48 inches. The "Intermittor" is designed to permit passage of air or

hydraulic fluid from below to the work area, through the indexing mechanism and dial.

Another product to be exhibited is a cam-operated indexing mechanism for speeds up to 1000 indexes per minute. A Ferguson

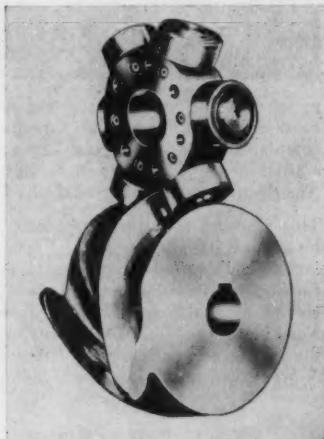


Fig. 3. Cam-operated indexing mechanism has a roller gear drive

roller gear drive is employed to provide special acceleration and self-locking, as well as zero backlash, characteristics. Precision indexing of 0.001 inch is guaranteed without shot pins or other locking methods.

Indicate Item 238 on postcard, page 325

Standard Pressed Steel Co. Set-Screws, Lock Fasteners, and Storage Units

Navy Pier, Booth 828

A line of Unbrako socket-head set-screws that can be tightened up to 40 per cent more than ordinary ones will be displayed by Standard Pressed Steel Co., Jenkintown, Pa. Called precision, high-torque set-screws, the new steel fasteners are available in a complete range of sizes from No. 0 up to 1-inch diameter. Advantages claimed are greater holding power, a more uniform fit resulting from closer thread and socket tolerances, and longer re-use and wear life. Sockets are up to 50 per cent deeper in some sizes, and fillets are stress-relieved.

Also to be exhibited for the first time will be Hollowell storage wall



Unbrako socket-head set-screw that can be tightened up to 40 per cent more than ordinary ones

units and Flexloc micro nuts. The storage wall units are nests of drawers for small items, which can be installed against a wall or in other ways to form a partition between work areas. The Flexloc micro nuts, made in brass and aluminum, are tiny lock fasteners

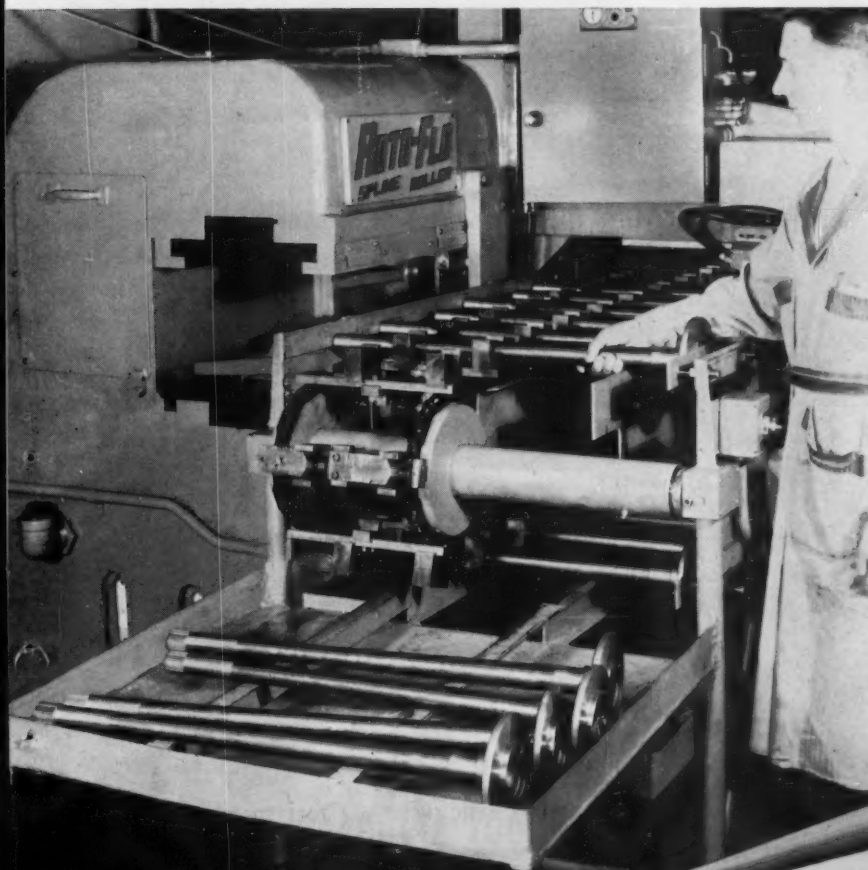
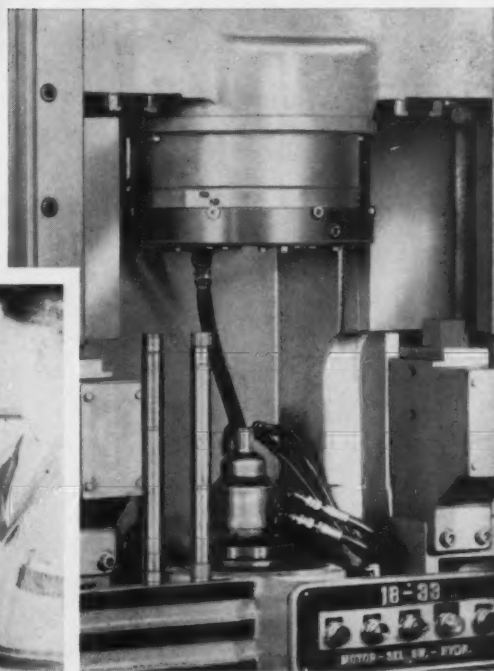
(Continued on page 322)



This Month's **GEAR PIX**

AUTOMATED SPEEDER...facilitates speeding of production gears in mesh with an accurate master or a master mating gear. Inspector places gears to be speeded in the chute, and flicks a lever to divert any rejects that exceed sound level requirements. Cycle time on helical gear shown is 6 seconds.

12 & 15 SECONDS, respectively, is the cutting cycle time for the $\frac{7}{8}$ " and $1\frac{1}{4}$ " width splines on an 18-33 Shear-Speed gear shaper. The 28-tooth, 24-pitch splines are formed on a relatively thin-walled hollow shaft adjacent to bearing surfaces.



SPLINES ON AXLE SHAFTS cold formed automatically on the Roto-Flo spline roller. This will be on exhibit at the Machine Tool Show.



**MICHIGAN
TOOL COMPANY**

7171 E. McNICHOLS RD. • DETROIT 12, MICH.
IN CANADA: COLONIAL TOOL CO., LTD.

an innovation important
SEE THESE LATHES AT THE



DIAL-

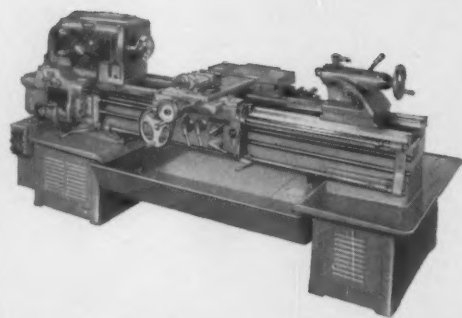
**outstanding
in 3 great
requirements**

which are indispensable in
furnishing amazing speeds on
work of utmost precision ...
LOWEST COST PER PIECE.

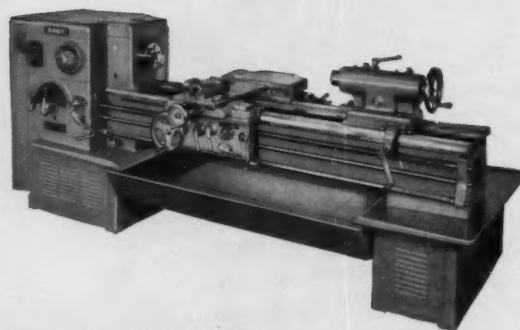
① GREATER RIGIDITY

**② SIMPLICITY of CONTROL
and OPERATOR CONVENIENCE**

③ PRODUCTIVITY



SIDNEY MODEL 16 ENGINE and TOOL ROOM LATHE



SIDNEY MODEL 32 DIAL-MATIC ENGINE and TOOL ROOM LATHE

to all industry!

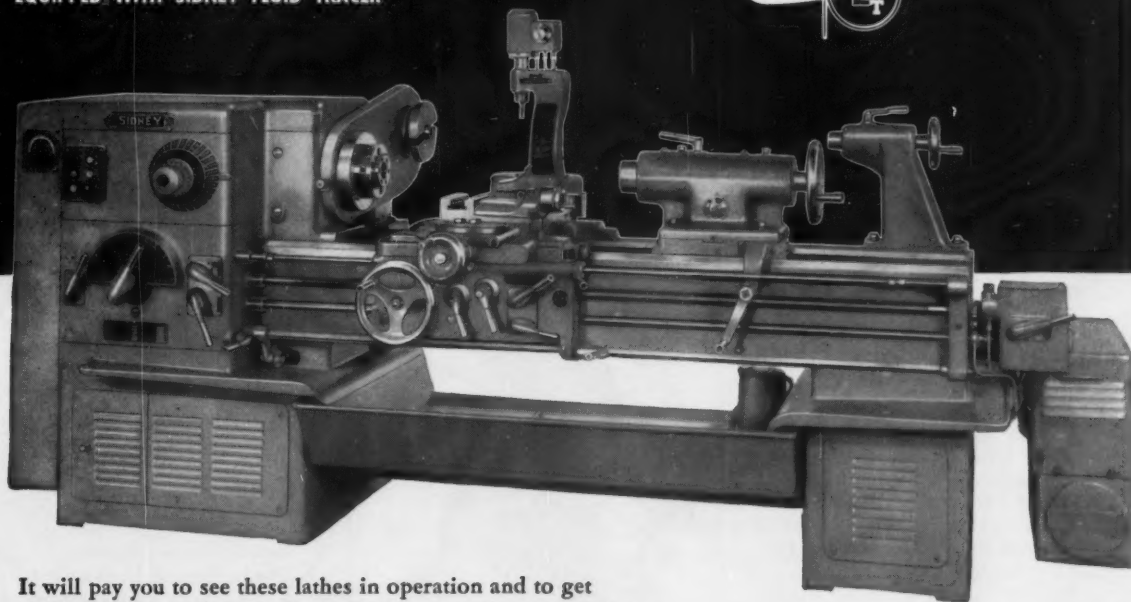
MACHINE TOOL SHOW SPACE 1116

MATIC LATHES

NEW

... PRACTICAL ... DEPENDABLE ... DESIGNED
to do MORE for you at LESS COST. Built on the fundamental SIDNEY
principles which have won international fame
since 1904 ... improved to satisfy the demand of the present
and far into the future.

SIDNEY MODEL 32 ENGINE OR TOOL ROOM LATHE
EQUIPPED WITH SIDNEY FLUID TRACER



It will pay you to see these lathes in operation and to get first-hand information. If you cannot come to the Show, please write us for bulletins or ask for representative to call.

THE SIDNEY MACHINE TOOL CO. Builders of Precision Machinery since 1904 **SIDNEY, OHIO**

For more information on products advertised, use Inquiry Card, page 323

MACHINERY, September, 1955—321

Preview of the Chicago Shows

which operate as a stop-nut as well as a lock-nut. They are designed primarily for instruments and electronic devices. Another feature at the Show will be the testing to destruction of Unbrako socket-head set-screws on an Olsen universal testing machine.

Indicate Item 239 on postcard, page 325

Starrett Exhibits Eighty-Five New Tools

Navy Pier, Booths 144 and 145

Five of the eighty-five new tools to be presented by the L. S. Starrett Co., Athol, Mass., are shown here. In Fig. 1 is a new micrometer specifically designed for measuring odd-fluted taps, milling cutters, reamers, and sim-

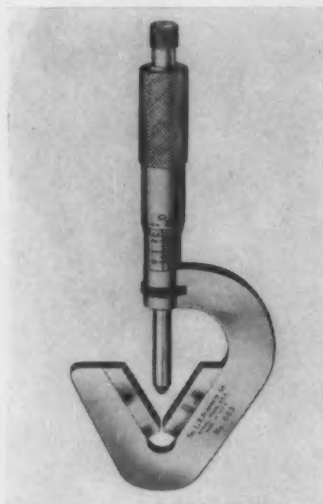


Fig. 1. Starrett micrometer for measuring odd flutes

ilar tools. Used like a conventional outside micrometer, it eliminates the need for special fixtures, and the slowness and uncertainty of other methods. Anvils and spindles have carbide facings for high resistance to wear. The micrometer is available in two models: No. 483 with V-anvil for three-flute cutters, and No. 485 for five-flute cutters.

Designed to cut clean, round holes in metals, wood, plastics, and other materials, the hole saw illustrated in Fig. 2 is double welded to combine a high-speed steel cutting edge with an extra-

tough body which, in turn, is welded to a rigid steel cap. The cap is threaded to receive interchangeable arbors having a 1/4-inch high-speed pilot drill. Arbors are available with 1/2-inch or 3/4-inch hexagon or 1/4-inch round



Fig. 2. High-speed, welded-edge hole saw

shanks for use in a wide variety of machine tools. A wide range of saw sizes provides for cutting holes from 5/8 to 4 1/2 inches.

Shown in Fig. 3 is a No. 253 dial-indicator set capable of handling most gaging jobs at a minimum cost. The set contains three indicators: a No. 25-111, graduated in 0.0001 inch and reading 0-5-0, with a capacity of 0.025 inch; a No. 25-131, graduated in 0.0005 inch, reading 0-25-0, and with a capacity of 0.125 inch; and a No. 25-441, graduated in 0.001 inch, reading 0-100, and having a capacity of 1.000 inch.



Fig. 3. Dial-indicator set made by Starrett

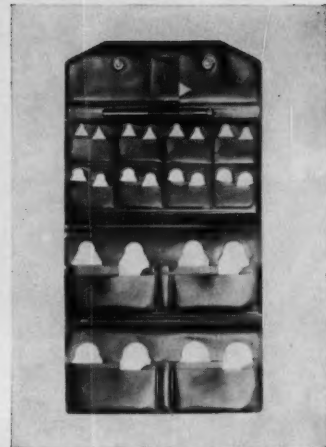


Fig. 4. Radius gages having five inspecting surfaces on each unit

Also on display will be the No. 167 series radius gages, Fig. 4. Five surfaces are available on each gage for inspecting both convex and concave radii. Made of stainless steel, the gages are available in four sets covering the range of 1/64 to 1/2 inch.

The No. 657 magnetic-base indicator shown in Fig. 5 is equipped with an on-off push-

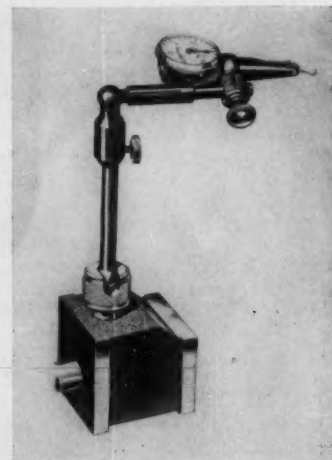


Fig. 5. Magnetic-base indicator holder with on-off push-button

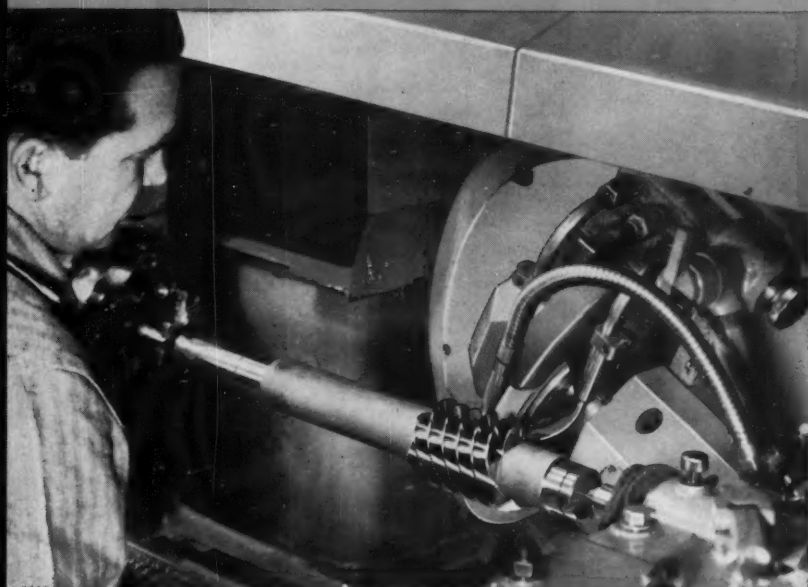
button. The holder can be attached firmly to any iron or steel surface, and is easily removed without marring the work.

Indicate Item 240 on postcard, page 325

(This section continued on page 328)

Grinding 5-Start Worm with 4" Lead

STANDARD STYLE 36 EX-CELL-O Precision THREAD GRINDER



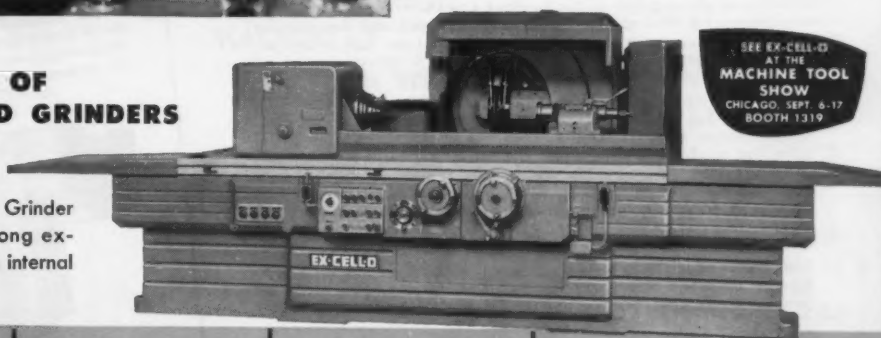
In the photograph at the left the operator is grinding a worm shaft for use in a special machine. The part is about 22" long and the worm is 4½" long, 3.430" O.D., has 5 starts, a pitch of .800", a lead of 4" and a tooth depth of .5454". The worm was ground in two operations on a standard Style 36 Thread Grinder. It was rough ground from the solid, hardened, then finish ground.

For complete information and specifications on the Style 36 and other Ex-Cell-O Thread Grinders contact your local representative or write today to Ex-Cell-O.



A COMPLETE LINE OF PRECISION THREAD GRINDERS

STYLE 36 Precision Thread Grinder—
a versatile machine for long external threads, available with internal attachment.



SEE EX-CELL-O
AT THE
MACHINE TOOL
SHOW
CHICAGO, SEPT. 6-17
BOOTH 1319

STYLE 50
Precision Thread Grinder—
a versatile machine for external work, also available with internal attachment.

STYLE 33
Precision Thread Grinder—a high production machine for external work.

STYLE 39-A
Precision Thread Grinder—a high production machine for internal threads.

STYLE 120
Our largest Thread Grinder. Grinds 10 feet of thread in one setting. Accommodates 12 feet of stock between centers.

EX-CELL-O CORPORATION • Detroit 32, Michigan

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G-E Type AK-1-50 Electrically Operated Air Circuit Breaker, 1600-amperes, 600 Volts, A-C. One pole shown. Made by General Electric Company, Low Voltage Switchgear Department, 6901 Elmwood Ave., Philadelphia, Pa.

USE
REVERE
EXTRUDED
SHAPES

they Save Money!



Here is the General Electric Type AK-1-50 Electrically Operated Air Circuit Breaker, 1600-ampere frame size used to protect low-voltage systems. The picture shows one pole of the contact, and in order to photograph it, the housing and the arc-quencher parts were removed. Note the Revere Extruded Shapes, and Rectangular Rod. There are three shapes, and one size of bar, all in copper, because copper has the highest electrical conductivity of all commercial metals.

If these shapes had to be "hogged" out of bar, they would be expensive, due to the machining time, and the scrap generated. While copper scrap is readily salable at good prices, it is costly from the machining standpoint. Extruded shapes by Revere, preformed to the desired contours, usually reduce machining to a cutting-off operation, plus such minor details as drilling which cannot be done during extrusion. Shapes naturally cost more per pound than bar or rod, but the ultimate saving makes up for the difference and more, sometimes several times.

Are you doing much machining of copper? If so, look into Revere Extruded Shapes. They may save money, and speed up production as well. See the nearest Revere Sales Office.

REVERE

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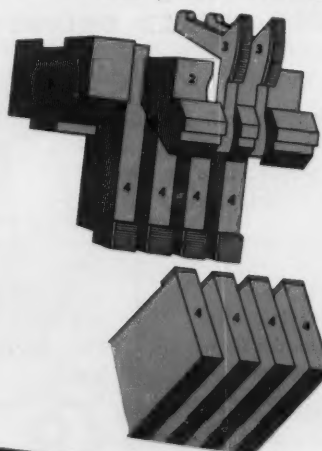
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Sketch showing details of contacts. Nos. 1, 2 and 3 are extruded and drawn copper shapes. No. 4 is rectangular copper bar. Cross hatching represents special arcing contacts brazed to the copper.



PRODUCT INFORMATION SERVICE

Use postage-free Business Reply Cards below to obtain more information on:

1. New Catalogues described in this issue
2. Products mentioned in the editorial pages
3. Products described in the advertisements

NEW CATALOGUES

SURFACE-MEASUREMENT INSTRUMENTS—Brush Electronics Co., Cleveland, Ohio. Folder containing information on instruments designed for the measurement of surface finish, and giving highlights on the Brush Surfindicator, a versatile gage for surface roughness measurement. There is also a description of the Metal Indicator, a portable shop instrument for identifying metals by comparison with known samples. Still another section is devoted to the Surface Analyzer, which provides an instantaneous and permanent chart record of a highly magnified profile of a surface. 1

LIQUID BLAST CLEANING EQUIPMENT—Pangborn Corporation, Hagerstown, Md. Bulletin 1403, containing 8 pages on the company's Hydro-Finish liquid blast cleaning equipment with photographs, detailed drawings, dimensions, sizes, and features of all models of EX-2 and EX-3 machines. The process is used in solving cleaning problems such as deburring, surface finishing and lubrication control, surface preparation for coating, die and mold maintenance, and general maintenance. 2

GEAR SHAPING MACHINES—Michigan Tool Co., Detroit, Mich. Bulletin SS-55, containing 8 pages of information on the two additions to the Shear-Speed gear shaper line—Models 18136 and 18206. Operating features and advantages are included. The bulletin points out these models have the capacity to shape gears up to 20 inches in diameter with 6-inch face width and diametral pitch of 2. Close-up photographs and simple line drawings illustrate the text. 3

ADJUSTABLE STROKE DIAPHRAGM PUMPS—Denver Equipment Co., Denver, Colo. Bulletin P8-B9, giving 8 pages of data on the company's adjustable stroke pumps with handwheels and positive regulation. An explanation of the operation that changes pulp flow from "O" stroke to maximum stroke while pumps are operating is featured. Photos, information, and a series of drawings explain the construction, mechanism, and capacity of the pumps. 4

ANGULAR WHEEL-SLIDE GRINDING MACHINES—Norton Co., Worcester, Mass. Catalogue 1658-1, containing 14 pages of the company's semi-automatic angular wheel-slide cylindrical grinding machines. It gives data on precision and

accuracy, durability, operating convenience, servicing ease, equipment specifications, machine specifications, and types available. Photographs and floor plan are included. 5

TEMPERATURE CONTROL FOR PLATING TANKS—Minneapolis-Honeywell Regulator Co., Industrial Division, Philadelphia, Pa. Data sheet 5.1-4, describing the application of Honeywell instrumentation to various types of plating tanks. Schematic diagrams of typical installations show the use of electric and pneumatic temperature control systems, and all recording, indicating, and non-indicating systems. 6

INFRA-RED HEATING—Fostoria Pressed Steel Corporation, Fostoria, Ohio. 20-page booklet entitled "Applications Unlimited," giving information on infra-red process with specific examples of uses. One section is devoted to typical case histories and another illustrates with general specifications, the types of industrial ovens available to the manufacturer. . 7

COOLANTS—Master Chemical Corporation, Toledo, Ohio. 56-page booklet describing proper procedures in the use of coolants to obtain longest tool life and best working conditions. The brochure should be helpful to machine operators

in determining proper concentrations and procedures to promote the most efficient machine production possible. 8

VERTICAL ROTARY MILLING MACHINE—Consolidated Machine Tool Co., Rochester, N. Y. 40-page illustrated brochure No. 651 on Newton continuous rotary milling machines, describing and exploring the application to various types of jobs and pointing out their economy on short-run work. Also the use of automatic self-opening and self-closing features are presented. 9

SPEED VARIATOR—Cleveland Worm & Gear Co., Cleveland, Ohio. Bulletin K-200, giving description, ratings, dimensions, and other engineering data on all models of the company's speed variator. Detailed information is included on the advantages, simplicity, operating characteristics, speed adjustment, and way to adapt variator to low output speeds. 10

MACHINE TOOL REPLACEMENT—Jones & Lamson Machine Co., Springfield, Vt. Bulletin giving information on reason for replacing machine tools, what machine tool equipment can do for the company, and how the tools can pay for themselves. Analysis form is also included with instructions for completing capital equipment replacement. 11

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HYDROSPIN FORMING MACHINE—Cincinnati Milling Machine Co., Cincinnati, Ohio. Publication M-1873-2, describing Hydrospringing, a forming process in which a work-piece is forced to take the shape of a hardened rotating mandrel. The advantages of Hydrospringing are explained and typical parts, controls, dimensions, and specifications are given. 12

PAINT SPRAYING EQUIPMENT—Sharpe Mfg. Co., Los Angeles, Calif. Catalogue featuring the newest line of paint spraying equipment developed since World War II, and giving complete descriptions in four major production areas: spray guns, compressors, auxiliaries, and safety devices. The booklet has a thumb index and is fully illustrated. 13

FLEXIBLE SHAFT MACHINES—Pratt & Whitney Division Niles-Bement-Pond Co., West Hartford, Conn. Bulletin 580, describing the company's Kellerflex flexible shaft machines used in every field of manufacturing. Various series of machines and attachments are covered, including dimensions, specifications, and applications. 14

AIR-LINE LUBRICATORS—Ingersoll-Rand Co., New York City. Form 4169, describing lubricators made in sizes for use with the smallest hand-held air tools to the largest quarry type drills. A new air-line lubricator in 1/2- and 1-pint sizes is described, as well as available fixed

air-line lubricators in 1-, 2-, and 12-quart sizes. 15

EXTRUDED STEEL SECTIONS—Jones & Laughlin Steel Corporation, Pittsburgh, Pa. Booklet describing typical sections of hot extruded and cold-drawn carbon steel and explaining how the company's hot extrusion plant can produce a wide range of extruded sections tailored to specifications in small or large quantities. . . . 16

ADJUSTABLE SPEED DRIVES—General Electric Co., Schenectady, N. Y. Bulletin GEA 5568A, featuring numerous application references, including color printing operations for G-E's Aca adjustable-speed drives. The 8-page publication includes statistics concerning installation and operating factors. 17

HAND TAPPING MACHINE—Producto Machine Co., Bridgeport, Conn. Bulletin TE4-102, containing 4 pages which picture and describe a universal hand tapping machine for accurate tapping of holes without tap breakage. Details on driving method, adjustability and capacity, and complete specifications are given. 18

MASONRY BLADES—The Carborundum Company, Niagara Falls, N. Y. Bulletin A-1308, containing 4 pages on the company's new Niagara line of masonry blades, including blade types and sizes, applications, a comparative grade chart, a description of the blade identification system, and ordering information. . . 19

MILLING ATTACHMENT—Axelson Mfg. Co., Division of U. S. Industries, Inc., Los Angeles, Calif. Bulletin illustrating and describing the Axelson Type 30 precision all-angle milling attachment, which is a quill having a 3 1/2-inch travel and being ideally suited for milling, boring, drilling, reaming, and grinding operations. 20

CUTTING-OFF MACHINES—Modern Machine Tool Co., Jackson, Mich. Catalogue containing 12 pages, describing automatic and manual cutting-off machines and bar features, and hot spinning machines that seal the ends of tubes. Specifications, illustrations, and diagrams are included. 21

INDEXING DEVICE—Hartford Special Machinery Co., Hartford, Conn. Bulletin S-104, containing 20 pages, illustrating, describing, and showing the uses of the Hartford Super-Spacer. Details are provided on the operation, care, and maintenance of the indexing devices. 22

RECONDITIONING DRILL AND CUTTER BITS—Kennametal, Inc., Latrobe, Pa. Booklet entitled "The When and How of Reconditioning Kennametal Bits," explaining reconditioning practices and procedures; grinding and wheel care; and maintenance of machine, drill, roof, earth, and rock bits. 23

HEAT-TREATING UNITS—Ipsen Industries, Inc., Rockford, Ill. Bulletin T-40, giving information on the company's heat-treating units with controlled atmosphere cooling. Included are descriptive drawings, photos, and text covering all phases of operation and specifications of the TFC series furnaces. 24

MINING MACHINE BITS—Allegheny Ludlum Steel Corporation, Pittsburgh, Pa. Leaflet describing a line of mining machine bits known as "G" and "H" series. Information is given on tool cost and reduced down time. Illustrations and specifications are included. 25

PRECISION MEASUREMENTS—Van Keuren Co., Watertown, Mass. Catalogue 36, containing 258 pages on precision measurements and giving technical and engineering information on problems and methods. It is arranged for easy, ready reference, and is fully illustrated. . . 26

SPLIT BALL BEARINGS—Split Ballbearing Corporation, Lebanon, N. H. Catalogue 54, containing 20 pages on the uses of split ball bearings and giving dimensions and specifications of standard series ball bearings, roller bearings, and pillow blocks. 27

DRILLING MACHINES—Cincinnati Lathe & Tool Co., Cincinnati, Ohio. Catalogue D-135, containing 24 pages on bench, floor, and multiple-spindle models, and giving installation, operation, maintenance, and parts list data. 28

SUBLAND DRILL-COUNTERBORES—Mowhawk Tools, Inc., Montpelier, Ohio. Brochure describing the company's series of subland drill-counterbores which are available in three types for any shank that may be required. 29

CAM-FOLLOWER BEARINGS—McGill Mfg. Co., Valparaiso, Ind. 4-page bulletin describing design and performance features of the company's new sealed Camrol cam-follower roller bearing. 30

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at the Chicago Shows



Speed Control Valve



Foot Operated



Solenoid Introlld (Pilot Operated)



Retrolld (Remote Controlled) MV,
Pressure Operated



Double Solenoid Direct Operated



Solenoid Introlld (Pilot Operated)



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Retrolld (Remote Controlled) TD,
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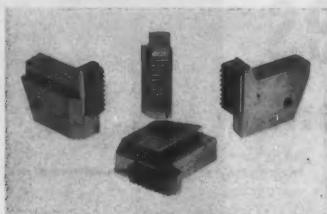


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Preview of the Chicago Shows



"Supermetric" ground-thread chasers

Geometric Shows Line of "Supermetric" Chasers

Machine Tool Show, Booth 223

Geometric Tool Co. Division of the Greenfield Tap & Die Corporation, New Haven, Conn., will exhibit its recently developed line of "Supermetric" chasers. All threads and other surfaces on these chasers are ground to a high finish, thus assuring accurate thread cutting and good surface quality.

Also to be shown is the company's complete line of self-opening die-heads and collapsing taps. A cut-away model of a large die-head and a collapsing tap will be on display.

Indicate Item 241 on postcard, page 325

Snow Nut-Tapping Machines

Machine Tool Show, Booth 213

Among the fifteen operating machines to be shown by the Snow Mfg. Co., Bellwood, Ill., will be the hopper-feed automatic nut-tapping machine, Fig. 1, which is built in six sizes, No. 0 to 5. These new machines are designed to handle

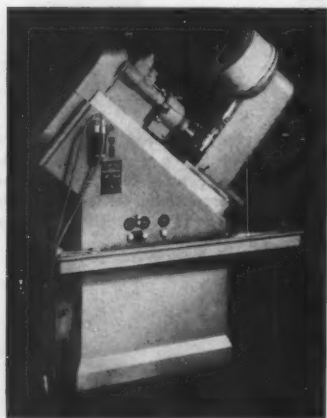


Fig. 1. Snow nut-tapping machine

Class 3 and 4 fits on standard and special nuts.

The nut-tapping machines will perform actual production jobs, from tapping No. 2 56-thread holes (at a rate of 7200 per hour) to 1-inch 8-thread holes in stainless steel.

The company will also introduce an automatic angular burring machine, and a horizontal, hopper-feed rivet drilling and tapping machine. Both can be tooled inexpensively and can turn out in excess of 4000 pieces per hour. Completely redesigned fully universal vertical drilling, tapping and threading machines will be shown performing a variety of interesting operations. A combination

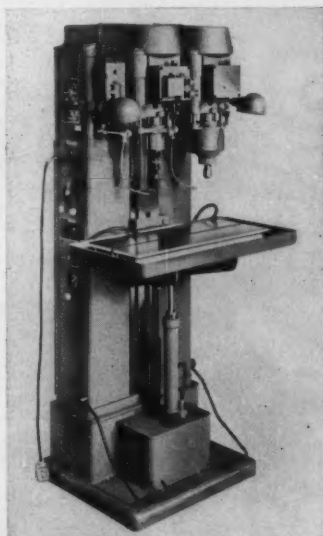


Fig. 2. Snow combination drilling and tapping machine

two-spindle drilling and tapping machine is shown in Fig. 2.

Indicate Item 242 on postcard, page 325

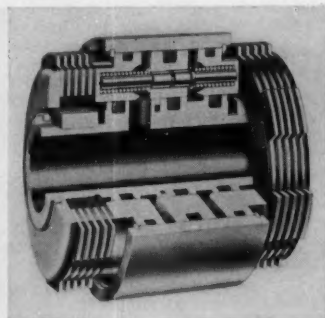
Twin Disc Oil-Actuated, Multiple-Plate Clutches

Navy Pier, Booth 103

Standardized oil-actuated, multiple-plate clutches for general industrial use will be displayed by the Twin Disc Clutch Co., Racine, Wis. Two models—single and duplex—will be available, and both are high-energy, high-inertia, and high-horsepower clutches especially adaptable to applications creating high temperatures

and operating under heavy loads.

Both models are readily adaptable to remote or push-button control without complicated linkage. Since the floating or pressure plate forms the ram of the cylinder, the ram travel increases automatically as the plate stack



Oil-actuated, multiple-plate clutch announced by Twin Disc Clutch Co.

wears. This eliminates adjustments to compensate for plate wear, and constant torque transmitting ability is thus provided.

Indicate Item 243 on postcard, page 325

Danly Presses, Accessories, and Hydraulic Equipment

Machine Tool Show, Booth 1302

On view at the exhibit of Danly Machine Specialties, Inc., Chicago, Ill., will be a 100-ton Auto-feed press. This heavy-duty two-point geared, eccentric shaft-drive press will be stamping at high speed with progressive dies. A new Danly designed coil cradle, automatic feed device, and scrap



Danly adjustable press control arm

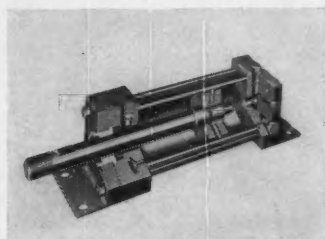
Preview of the Chicago Shows

cutter will operate in conjunction with the press.

A new adjustable press control arm to be shown provides a flexible means of positioning the "run" and "stop" buttons on presses. The buttons are mounted on a bar attached to a telescoping arm which permits any height adjustment desired. A ball joint at the top gives universal movement.

Accessories on exhibit include a rotary-cam limit switch, oil-pressure safety switch, air-control manifold, and dual air valve.

Indicate Item 244 on postcard, page 325



"Logansquare" air cylinder

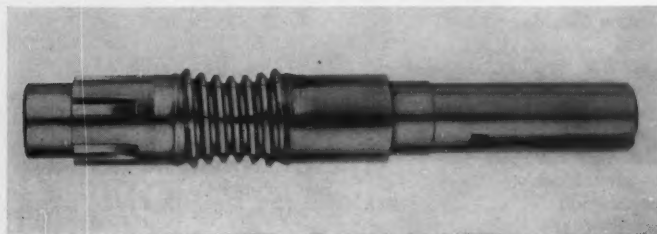
Logansquare Air Cylinders

Machine Tool Show, Booth 1114

A new line of "Logansquare" air cylinders will be shown for the first time by Logansport Machine Co., Inc., Logansport, Ind. The cut-away air-cylinder illustrated, which is the square-covered foot-mounted type, will be one of the models on view.

Also displayed will be a regulator, filter, and lubricator stand illustrating the method used to administer lubricant to the air components. A production lathe will be equipped with a "P.R.O." (power release only) chuck and a rotating air cylinder. An automatic liner turning machine will show the adaptability of air devices to automatic equipment.

Indicate Item 245 on postcard, page 325



Double-enveloping worm made from Crucible Max-El 3 1/2 alloy steel

Armstrong Insert Holder

Coliseum, Booth 550

Armstrong Bros. Tool Co., Chicago, Ill., will exhibit its lines of tool-holders, cutting tools, set-up



Tool-holder for throw-away inserts

and hold-down devices, wrenches, and other machine-shop specialties. A new tool-holder for throw-away carbide inserts will be a feature of the company's display.

Indicate Item 246 on postcard, page 325

Molybdenum Sulphide Alloy Steel

Navy Pier, Booth 830

A high-quality free-machining alloy steel, Max-El 3 1/2, is being produced by Crucible Steel Co. of America, Pittsburgh, Pa. One of a line of such steels with manganese molybdenum sulphide as the free-machining agent, this alloy in particular lends itself to production heat-treating with a minimum of warping. It is also possible to do all required machining with the work-piece in a heat-treated condition. An example of this is the illustrated double-enveloping worm. This part was heat-treated in bar form to a hardness ranging from 35 to 38 Rockwell C. The blank was then completely machined, yielding the necessary close tolerances and surface finish quality. It also eliminated intermediate operations.

Indicate Item 247 on postcard, page 325



Black granite surface plate

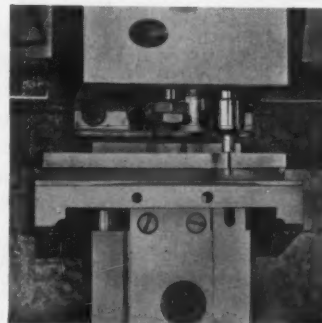
Challenge Surface Plates

Navy Pier, Booth 529

The Challenge Machinery Co., Grand Haven, Mich., will display the company's entire line of precision equipment for the tool and machine industries. Included will be semi-steel lay-out surface plates, welding tables, checking tables, adjustable floor plates, bench plates, and lapping plates.

A feature of the exhibit will be Clovis-Black granite surface plates, such as the one illustrated. These plates are composed of "deep earth" granite finished by a special rotary honing process. Hardness is said to be greater than hardened tool steel, and the plates are non-magnetic.

Indicate Item 248 on postcard, page 325



Multi-Slide tapping unit eliminates secondary operation

Tapping Unit for Multi-Slide

Machine Tool Show, Booth 215

The U. S. Tool Company, Inc., Ampere, N. J., will introduce a tapping unit for application on the Multi-Slide machine. A No. 33 Multi-Slide machine, equipped with such a unit, will be turning out a completely formed metal stamping. Operations will include the piercing, extruding, and tapping of a 6-32 hole. Coil stock will be fed into the machine, and a part completed on each stroke.

Indicate Item 249 on postcard, page 325

Index of Companies Whose Products Will Be on Display at Shows

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A Preview of Some of the Additional Exhibits

IN addition to the new or improved machines illustrated and described in the preceding pages, there will be many other interesting exhibits at the Chicago Shows, a few of which are briefly described in the following:

Commander Mfg. Co., 4225 W. Kinzie St., Chicago 24, Ill., (Coliseum, Booth 502) will demonstrate the company's complete line of drilling and tapping equipment, and related accessories. Two new tools—a Multi-Tapper and a pneumatic tapper—will be included. The Multi-Tapper is an automatically reversing, multiple-spindle tapping head, and the pneumatic tapper, a high-speed, single-spindle tapping head.

Wysong & Miles Co., Greensboro, N. C., (Machine Tool Show, Booth 913) will display five squaring shears and one all-steel bending roll. The largest power squaring shear will have a 10-foot cutting length and a capacity up to 1/4-inch thick mild steel. The bending roll has a capacity of 8-gage mild steel and a working length of 4 feet.

Parker Appliance Co., 17325 Euclid Ave., Cleveland 12, Ohio, (Navy Pier, Booth 415) will show for the first time the "Tork-grip," a manual tool for non-slip tube bending. The tool, which may be held in a vise or permanently mounted on a work-bench, features a unique clamping arrangement which permits bending even

stainless steel tubing without slipping and resultant flattening.

Northwestern Tool & Engineering Co., 115 Hollier Ave., Dayton 3, Ohio, (Navy Pier, Booth 847) will exhibit V-pads to be used as solid locators or as clamps with the company's toggle shoe clamps. The V-pads are not heat-treated, and may be drilled, tapped, or counterbored to suit.

Size Control Co., Division of American Gage & Machine Co., 2500 W. Washington Blvd., Chicago 12, Ill., (Machine Tool Show, Booth 417) will present "Bore-master" plain ring gages. These low-cost, master gages are made within plus or minus 0.0002 inch of any specified size, and are accurate to 0.0001 inch for roundness, straightness, and taper, non-accumulative.

Rowe Machinery & Mfg. Co., Inc., Dallas, Tex., (Navy Pier, Booth 179) will introduce improved models of automatic straightening and feeding machines for sheet metal coil stock. The rolls are driven through a Warner electric brake and clutch. All straightening machines have seven straightening rolls and four pinch rolls. Rowe will also display its line of motor-driven, automatic coil cradles, combination cradle-straighteners, roll feeds, and sheet fanners.

Horton Chuck, Division of the E. Horton & Son Co., Windsor Locks, Conn., (Navy Pier, Booth

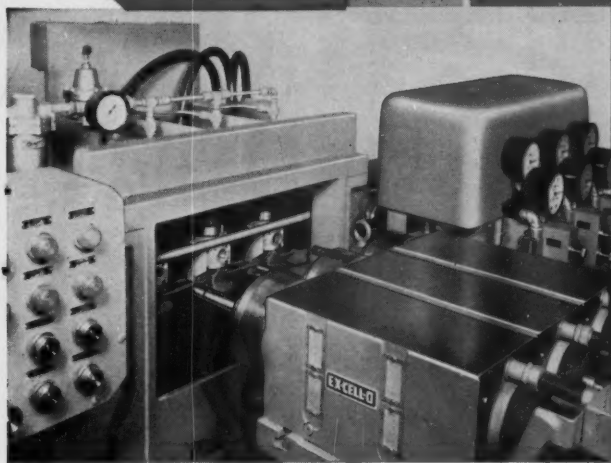
836) will display a centering device specially designed to be incorporated in its line of J type chucks used for machining jet engine parts. This "Controlled Centering Pressure Chuck," having three universal jaws and twelve independent jaws, is able to center, at a pre-set centering pressure, thin-walled rings and parts without distorting them during the centering process.

Barry Controls, Inc., Watertown, Mass., (Navy Pier, Booth 153) will show the company's complete line of self-leveling Barrymounts for fast machinery mounting, and spring mounts for isolating high impacts. The latter mounts have from one to nine springs, with an effective load range of from 250 to 6700 pounds per mount. Barrymounts are capable of carrying loads up to 13,000 pounds per mount.

Apex Tool & Cutter Co., Shelton, Conn., (Navy Pier, Booth 855) will exhibit standard carbide-tipped tools and holders for axle-journal turning operations on Sellers lathes. Reground tool bits can be placed in the holder, adjusted to original cutting dimensions, and locked securely in place. Also to be shown are a universal radius grinding fixture for all types of cutting tool bits, and double-serrated, planer tool bits and holders. On the planer tools, an inserted bit holds a tapered carbide plug, which can be indexed to

(Continued on page 338)

Style 112-C Ex-Cell-O Precision Boring Machine, equipped for automation. Operations: Transfer mechanism moves three parts at a time from conveyor to fixture, to gaging station (optional), back to conveyor.



Net production is 300 pieces per hour. Three pistons are machined simultaneously by three motorized spindles each carrying semifinish and finish boring tools.

Standard EX-CELL-O Machine Equipped for AUTOMATION

**FAST, ACCURATE
PRECISION BORING
OF WRIST PIN HOLES**

Pistons are brought automatically from the conveyor to boring position, three at a time. Operations are fast and accurate, producing a fine finish.

Automatic inspection equipment may be incorporated, with lights to indicate size limit warnings and rejections; a rejection stops the machine.

Call your Ex-Cell-O representative or write Ex-Cell-O in Detroit for complete facts on this or similar production savings opportunities through automation.



EX-CELL-O CORPORATION

DETROIT 32, MICHIGAN

- MANUFACTURERS OF PRECISION MACHINE TOOLS
- GRINDING SPINDLES • CUTTING TOOLS
- RAILROAD PINS AND BUSHINGS
- DRILL JIG BUSHINGS
- AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS
- DAIRY EQUIPMENT

new Starrett tools

to help you do a better job of
precision measuring

These new tools are typical of the pioneering leadership that has marked Starrett's 75 years of service to industry. With the more than 3000 other items shown in the big, new Starrett 75th Anniversary Catalog, they represent the world's most complete line. Send for your free catalog.

NEW DIAL INDICATORS

140 models to meet every requirement — all with new high precision-low friction design features.



NEW RADIUS GAGES

No. 167. Each with five gaging surfaces. Made of rustproof stainless steel with Satin Finish. 6 convenient sets.



NEW MUL-T-ANVIL MICROMETER

No. 220. Now available in 0-1" and 1-2" sizes. Vise-type frame holds round or double ended flat anvil (furnished) — also special anvils.

NEW DIAL INDICATOR SET

No. 253. Three indicators in one handy kit handle most gaging jobs. Graduated .001", .0005" and .0001"; ranges .025", .125" and 1.000".

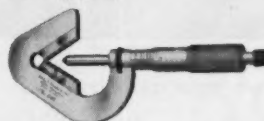


NEW "SATIN CHROME" STEEL RULES

Flexible and spring tempered types, 6 and 12 inch lengths, fractional or decimal graduations... easy to read with long-wearing, no-glare Satin Chrome Finish.

NEW MICROMETERS FOR MEASURING ODD FLUTES

No. 483, No. 485. Models for measuring 3 or 5-fluted cutting tools. Read direct in thousandths — eliminate special fixtures. Satin Chrome Finish. Carbide facings on anvil and spindle.



NEW MAGNETIC BASE INDICATOR HOLDER

No. 657. Powerful permanent magnet type base holds Starrett "Last Word", No. 196 or No. 25 Series dial indicators. On-off push button. Universal adjustments.



NEW HIGH SPEED WELDED EDGE HOLE SAWS

Double-welded, shatterproof. Sizes from 3/8" through 4 1/2". Interchangeable arbor with pilot drill available with 1/2" and 3/4" hex shanks; also 1/4" round shank.



NEW LAYOUT DYE and INSTRUMENT OIL

A high quality tool and instrument oil and an easy-to-apply layout dye... now available in handy tool box size cans.

Starrett®

SINCE 1880 WORLD'S GREATEST TOOLMAKERS

SEE THE STARRETT EXHIBITS
BOOTHS 144-145
Production Engineering Show
SPACE 1720
National Metal Show



BIG NEW CATALOG

75th Anniversary Edition
Describes and illustrates over 3000 Starrett Tools including 85 new tools. Send the coupon below for your FREE COPY.



THE L. S. STARRETT COMPANY
Dept. D, Athol, Mass., U. S. A.

Please send my free copy of the big, new Starrett 75th Anniversary Catalog

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MACHINERY'S DATA SHEET

AMERICAN STANDARD KNURLING—5

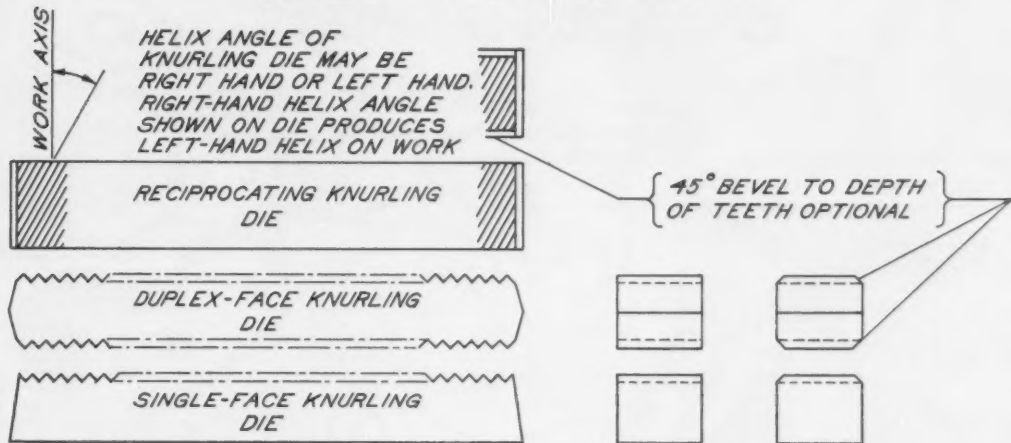


Fig. 8. Typical flat reciprocating knurling dies—diagonal teeth

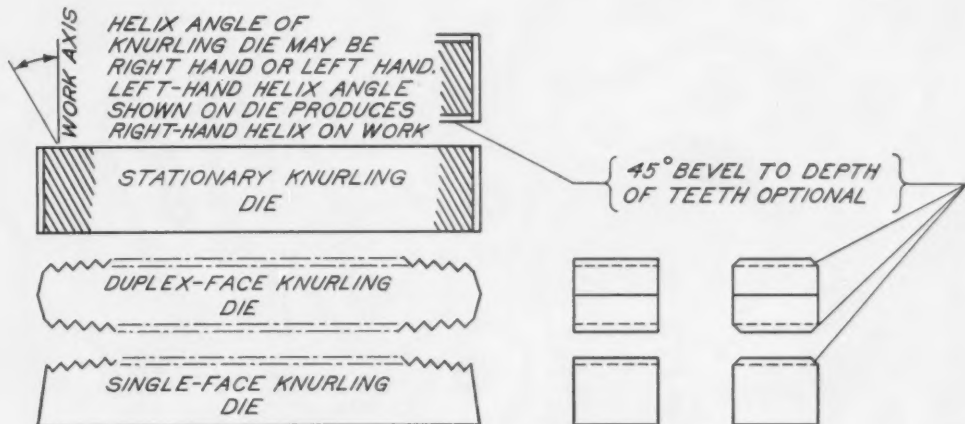


Fig. 9. Typical flat stationary knurling dies—diagonal teeth

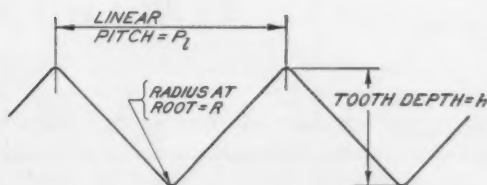


Fig. 10. Flat knurling die—straight teeth

$$N_w = \text{number of teeth on work} = P \times D_w$$

$$h = \text{tooth depth}$$

$$Q = \text{tracking correction factor applied to linear pitch on die}$$

$$P_L = \text{linear pitch on flat die} = P - Q \text{ or } \frac{\pi}{P - Q}$$

Markings on Knurls and Dies

Each knurl and die should be marked as follows:
When *straight*, indicate its diametral pitch.

When *diagonal*, indicate its diametral pitch, helix angle, and hand of the angle.

When *diamond*, indicate its diametral pitch and helix angles.

$$R = \text{radius at root}$$

$$P = \text{diametral pitch} = \frac{N_w}{D_w}$$

$$D_w = \text{work blank (pitch) diameter} = \frac{N_w}{P}$$

Extracted from ASA B5.30-1953 with permission of publisher, American Society of Mechanical Engineers

MACHINERY'S DATA SHEET

AMERICAN STANDARD KNURLING—6

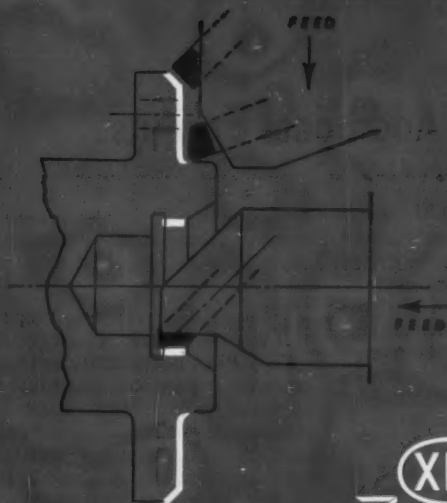
**Table 1. Knurling Data for Fractional Blank Diameters, in Inches,
Using Standard Diametral Pitch Knurling Tools**

| Diametral Pitch | 160 | | 128 | | 96 | | 64 | |
|---|---------------------|--|---------------------|--|---------------------|--|---------------------|--|
| Approximate Depth of Tooth, or Increase in Knurled Diameter | 0.009 | | 0.012 | | 0.016 | | 0.024 | |
| Diameter of Blank* | Knurled Diameter | Number of Teeth in Knurled Circum- ference | Knurled Diameter | Number of Teeth in Knurled Circum- ference | Knurled Diameter | Number of Teeth in Knurled Circum- ference | Knurled Diameter | Number of Teeth in Knurled Circum- ference |
| 3/32 0.094 | 0.103 | 15 | | | | | | |
| 1/8 0.125 | 0.134 | 20 | | | | | | |
| 9/64 0.141 | .... | .. | 0.153 | 18 | | | | |
| 5/32 0.156 | 0.165 | 25 | 0.168 | 20 | | | | |
| 11/64 0.172 | .... | .. | 0.184 | 22 | | | | |
| 3/16 0.188 | 0.197 | 30 | 0.200 | 24 | | | | |
| 13/64 0.203 | .... | .. | 0.215 | 26 | | | | |
| 7/32 0.219 | 0.228 | 35 | 0.231 | 28 | | | | |
| 15/64 0.234 | .... | .. | 0.246 | 30 | | | | |
| 1/4 0.250 | 0.259 | 40 | 0.262 | 32 | 0.266 | 24 | | |
| 17/64 0.266 | .... | .. | 0.278 | 34 | .... | .. |  |  |
| 9/32 0.281 | 0.290 | 45 | 0.293 | 36 | 0.297 | 27 | | |
| 19/64 0.297 | .... | .. | 0.309 | 38 | .... | .. |  |  |
| 5/16 0.312 | 0.321 | 50 | 0.324 | 40 | 0.328 | 30 | | |
| 21/64 0.328 | .... | .. | 0.340 | 42 | .... | .. |  |  |
| 11/32 0.344 | 0.353 | 55 | 0.356 | 44 | 0.360 | 33 | | |
| 23/64 0.359 | .... | .. | 0.371 | 46 | .... | .. |  |  |
| 3/8 0.375 | 0.384 | 60 | 0.387 | 48 | 0.391 | 36 | 0.399 | 24 |
| 25/64 0.391 | .... | .. | 0.403 | 50 | .... | .. | 0.414 | 25 |
| 13/32 0.406 | 0.415 | 65 | 0.418 | 52 | 0.422 | 39 | 0.430 | 26 |
| 27/64 0.422 | .... | .. | 0.434 | 54 | .... | .. | 0.446 | 27 |
| 7/16 0.438 | 0.447 | 70 | 0.450 | 56 | 0.454 | 42 | 0.462 | 28 |
| 29/64 0.453 | .... | .. | 0.465 | 58 | .... | .. | 0.477 | 29 |
| 15/32 0.469 | 0.478 | 75 | 0.481 | 60 | 0.485 | 45 | 0.493 | 30 |
| 31/64 0.484 | .... | .. | 0.496 | 62 | .... | .. | 0.508 | 31 |
| 1/2 0.500 | 0.509 | 80 | 0.512 | 64 | 0.516 | 48 | 0.524 | 32 |
| 33/64 0.516 | .... | .. | 0.528 | 66 | .... | .. | 0.540 | 33 |
| 17/32 0.531 | 0.540 | 85 | 0.543 | 68 | 0.547 | 51 | 0.555 | 34 |
| 35/64 0.547 | .... | .. | 0.559 | 70 | .... | .. | 0.571 | 35 |
| 9/16 0.562 | 0.571 | 90 | 0.574 | 72 | 0.578 | 54 | 0.586 | 36 |
| 37/64 0.578 | .... | .. | 0.590 | 74 | .... | .. | 0.602 | 37 |
| 19/32 0.594 | 0.603 | 95 | 0.606 | 76 | 0.610 | 57 | 0.618 | 38 |
| 39/64 0.609 | .... | .. | 0.621 | 78 | .... | .. | 0.633 | 39 |

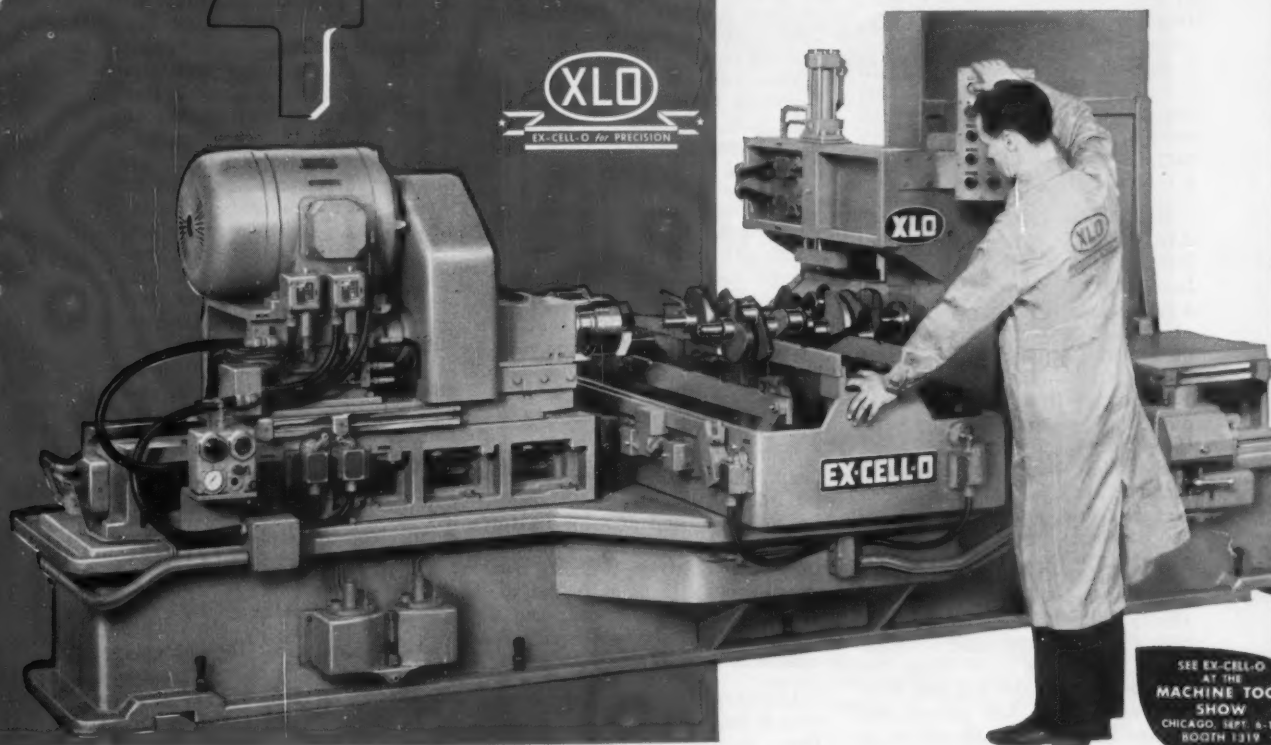
*Decimal equivalents are rounded off in accordance with American Standard Z25.1—1940. For unlisted diameters refer to formulas in Fig. 4.

Note: Use of 64 diametral pitch knurl should be avoided as much as possible. For simplification of tools it is recommended that preference be given to use of 96 diametral pitch (shown in bold face type).

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American Society of Mechanical Engineers



On this Ex-Cell-O special Machine two standard, hydraulically operated slides are mounted on a base with a transfer type fixture between them. The left slide, which supports the spindles, advances, and hydraulically operated chucks grip and rotate the parts. Then the right slide carrying the tools advances. Crankshaft operations include precision boring a diameter within limits of $\pm .0005"$, holding the bore concentric with main bearings, facing a surface square with main bearings, and chamfering an edge. Surface cuts are indicated in white in diagram at left.



EX-CELL-O Special Machine Bores, Faces 2 Crankshafts **SIMULTANEOUSLY**

What an improvement!

Automation equipment picks up two automotive crankshafts, places them in machining position, bores, faces and chamfers the flange ends simultaneously, and transfers them to the unloading position *all in one automatic cycle*. Building special purpose machines is an Ex-Cell-O forte. Manufacturers with problems in accuracy, production, and in combining numerous operations, look to Ex-Cell-O.

In return for this confidence Ex-Cell-O builds them special machines which quickly pay for themselves through substantial production in-

creases, improved quality, and reduced unit costs.

Whatever your plans for greater, more economical production, they can be materialized at Ex-Cell-O. Your Ex-Cell-O representative will be happy to discuss them with you.

EX-CELL-O CORPORATION

DETROIT 32, MICHIGAN

MANUFACTURERS OF PRECISION MACHINE TOOLS • GRINDING SPINDLES
CUTTING TOOLS • RAILROAD PINS AND BUSHINGS • DRILL JIG BUSHINGS
AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMENT

A Preview of Some of the Additional Exhibits

(Continued from page 332)

present new cutting edges, and ground so as to maintain the same cutting angles, regardless of position.

Century Electric Co., 1806 Pine St., St. Louis, Mo., (Navy Pier, Booth 418) will introduce a line of totally enclosed, fan-cooled electric motors in 1/2 to 100 H.P. sizes, and a line of shorter, round-frame, flange-mounted motors in 1 to 15 H.P. sizes. An additional feature will be a selective speed unit driving four motors, which may be operated by visitors from a console type control panel.

I. O. Johansson Co., 7730 Austin Ave., Skokie, Ill., (Coliseum, Booth 320) will demonstrate a box-column drilling machine and a radial drill. The box-column machine has a 2-H.P. motor, a 6-inch quill travel, and a No. 4 Morse taper spindle. Drilling capacity is 1 3/4 inches in cast iron. The radial drill is designed for use when the part being drilled is too large for a table. The drilling head is mounted on a sliding ram which travels 2 feet, and can be rotated 360 degrees.

S-P Mfg. Corporation, 12415 Euclid Ave., Cleveland 6, Ohio, (Navy Pier, Booth 115) will display a rotating hydraulic cylinder. Built in various bore sizes, the cylinders are rated for use with pressures up to 750 pounds per square inch, and at speeds up to 3000 R.P.M.

Detroit Bevel Gear Co., 8130 Jos. Campau Ave., Detroit 11, Mich., (Navy Pier, Booth 511) will show the company's lines of Almetal universal joints and gears. Gears to be displayed include spur, helical, spiral bevel, hypoid, straight bevel, Zerol, and flywheel ring types.

Industrial Diamond Association of America, Inc., 124 E. 40th St., New York 16, N. Y., (Navy Pier, Booth 139) will illustrate various manufacturing processes which depend upon industrial diamond tools and products. Also, there will be a limited exhibition showing the various types of diamond tools and products, and a display of diamonds as mined.

Link-Belt Co., 307 N. Michigan Ave., Chicago 1, Ill., (Navy Pier,

Booth 433) will exhibit the company's complete line of power transmission and conveying equipment. Of special interest will be a running unit composed of three P.I.V. variable-speed drives, including one with hydraulic controls, one with electronic controls, and one with pneumatic controls. Also to be shown will be ball-bearing trolleys for overhead conveyors, ball and roller bearings, babbitted bearings, roller and silent chain, lock-nuts and washers, flexible couplings, gear drives, and conveyors.

Adamas Carbide Corporation, Kenilworth, N. J., (Navy Pier, Booth 445) will present a "Throw-Way" tool-holder for carbide throw-away inserts. The holder features an adjustable, carbide-surfaced, combination chip-breaker and top clamp, and an indexable and replaceable, hardened tool steel anvil.

Sperry Products, Inc., Danbury, Conn., (Navy Pier, Booth 451) will demonstrate an ultrasonic Reflectoscope and attachment for the continuous production inspection of steel strip; a Protectron punch press attachment which detects mechanical overload; and a precision, single-tube, machinery control system.

Lindberg Division, Teer-Wickwire & Co., Jackson, Mich., (Navy Pier, Booth 546) will display Lindberg "Red Cap" air and hydraulic cylinders. A working model of a "square head" cylinder will be a feature of the exhibit.

Diehl Mfg. Co., Somerville, N. J., (Navy Pier, Booth 429) will exhibit a line of motors designed for machine tools under special service conditions. Featured will be a space-saving, flat type motor; a standard, open motor; a totally enclosed, fan-cooled motor; shaftless motors; and power transmitters.

Miller Fluid Power Co., 2040 N. Hawthorne Ave., Melrose Park, Ill., (Navy Pier, Booth 1819) will present the company's "College of Cylinder Knowledge" featuring developments in air and hydraulic cylinders, boosters, and accumulators. One display will show how to obtain up to 10,000 pounds per

square inch hydraulic pressure output from shop air-pressure input.

Chicago Dial Indicator Co., 180 N. Wacker Drive, Chicago, Ill., (Navy Pier, Booth 525), will demonstrate a precision checking instrument so finely made that it can measure the hardness of a human eyeball. This company will also have on exhibition a complete line of fine precision instruments of special interest to inspectors, machinists, and toolmakers. Among the instruments featured will be the Geneva dial indicator, dial indicator test set, bench center set, test set with magnetic base, regular test sets, bench gages, dial snap gages and depth gages. Important features of the Chicago dial indicator include the continuous reading dial for 0.001-, 0.0005-, and 0.0001-inch graduations, and threaded stems for fitting bases and is driven by 5-, 7 1/2- or checking jobs.

Balemaster Division, East Chicago Machine Tool Corporation, 4801 Railroad Ave., East Chicago, Ind., (Coliseum, Booth 650) will unveil a lightweight, portable, hydraulic scrap-metal baler. This machine compresses the contents of the 8-cubic-foot charging compartment into a briquette 12 by 12 by 12 inches, weighing up to 120 pounds, depending upon the material being baled. No pit is required for this machine. It will bale scrap and trimmings up to 54 inches in length. The machine weighs approximately 4000 pounds and is driven by 5-, 7 1/2- or 10-H.P. motors.

* * *

Five-Year Guarantee on Machine Tools

Machine tool builders customarily give a one-year guarantee against defects in the equipment they build. The Cincinnati Shaper Co., Cincinnati, Ohio, has now announced that beginning this month there will be a five-year factory guarantee on the material and workmanship of all press brakes, shears, and shapers built by the concern.

another
Outstanding Elmes Development
 in Metalworking Press Design

the **ELMES**
PIPELESS
 HYDRAULIC PRESS



This exclusive Elmes® Press design has put an end to high-pressure piping troubles. The main hydraulic circuit in these Elmes Presses *has no piping!* The advantages of this unique pipeless construction, proved by widespread use throughout industry over an extensive period, assure a *radical reduction in maintenance cost, with virtual elimination of downtime.*

In Elmes Pipeless Presses, all high-pressure hydraulic fluid is conducted through short, direct passages drilled in the structural parts. There are no high-pressure screwed joints to loosen, no oil dripping from loosened fittings, no breaking of welded joints. Press operation is smooth, quiet. Reversal of the ram is shockless. Vibration is greatly reduced. Turbulence and oil heating are minimized. Response to electrical controls is prompt and precise.

Any Elmes Metalworking Press, standard or special, can be equipped with pipeless construction—and at no premium. Find out now how your production will benefit from the matchless performance of Elmes Pipeless Hydraulic Presses. A proposal to suit your particular requirements, or further information, will be supplied on request. Contact your Elmes Distributor or write us direct.

HIGH-SPEED "PIPELESS" PRESS
 with two reversible pumps

450-Ton Elmes Single-Action Metal Drawing & Forming Press, with many special features including the revolutionary Elmes Pipeless construction. This press employs two reversible pumps, providing the following operating speeds per minute: advance—550", press—126", return—550".



*Be sure to see the Elmes
 PIPELESS Press
 in operation at the Show*

ELMES

AMERICAN STEEL FOUNDRIES • ELMES ENGINEERING DIVISION
 1162 Tennessee Avenue... Cincinnati 29, Ohio

HYDRAULIC PRESSES & EQUIPMENT

METAL-WORKING PRESSES • PLASTICS MOLDING PRESSES • PUMPS • ACCUMULATORS



Between Grinds

By E. S. Salichs

Jumping Jiggers

A revolving cocktail glass 4 feet high, filled with specimens of the various types of mechanical springs made by the Associated Spring Corporation, was displayed at a show held along with the annual convention of the National Association of Purchasing Agents. Sales representatives for the concern dispensed technical information on the cocktail's contents.

What Point Progress

The familiar post office pen that country-wide scratched and blotted was being replaced with easy-to-write ballpoints. Easy to take, too, the public discovered. P.O. Verdict: Back to pens that write like hens.

The Spots that Won't Rub Off

By using new green and black inks in printing United States money, the Government is saving \$5,000,000 annually, *P. G. and E Progress* tells us. Previously, it was necessary to hand-insert protective paper between the bills while stacking them. Who said anything about carbon paper?

Year-Round Comfort

Cooling off criminals in Oneonta, Ala., is a natural now that an air-conditioned jail has been built to house them. The jail is part of a new county court house which uses a Trane UniTrane air-conditioning system. But will a hot wave stimulate a crime wave?

Money Double Talks

To show the relationship of the Clinton Machine Co. to the welfare of the town of Maquoketa, Iowa, a payroll of more than \$107,000 was paid to employees one week in two-dollar bills.

Trusting Travel

During shipment, an electric motor becomes a delicate, fragile object that must be shielded from shock, vibration, dust, and dirt. A corrugated board box designed by the National Container Corporation recently received an award from the Fibre Box Association because it supplies such protection while costing and weighing less than wood containers.

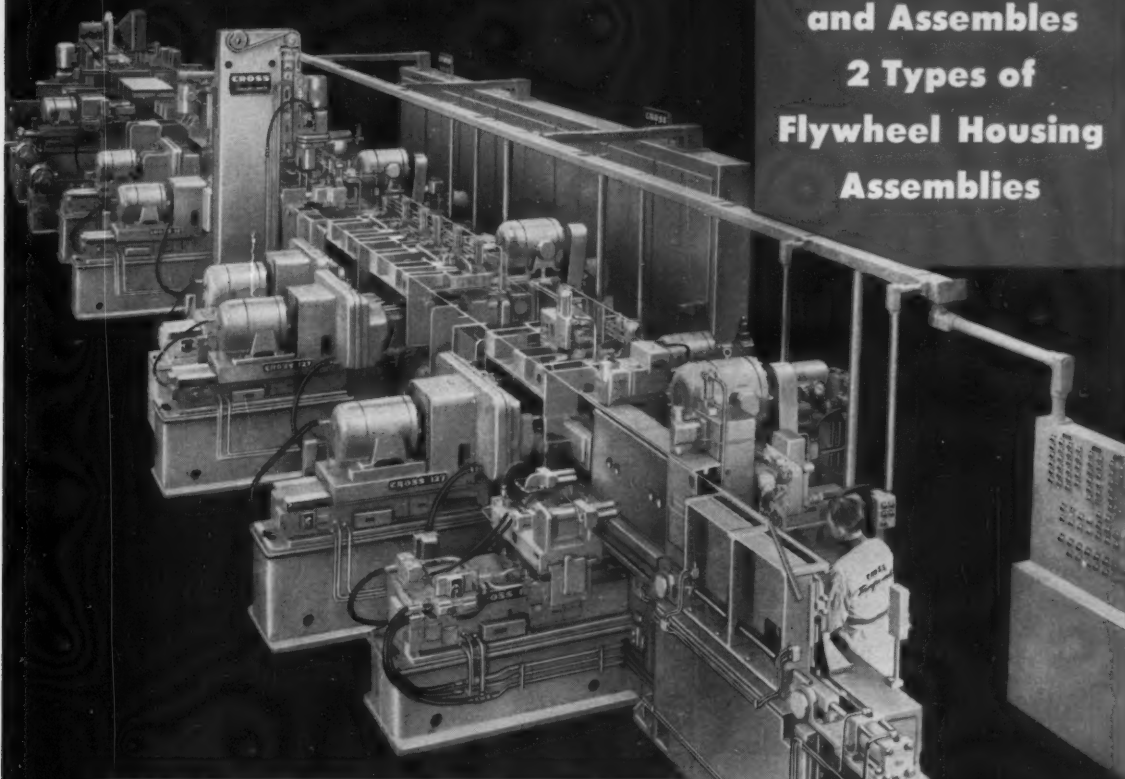
You are cordially invited to visit MACHINERY'S Booth No. 226 at the Chicago Machine Tool Show. Don't R.S.V.P.—just S.T.O.P.



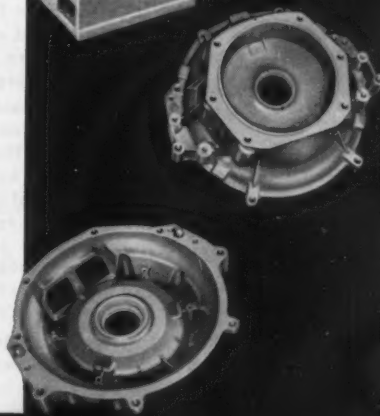
EYE, EYE, SIR—After admiring this pretty girl, who works at the Carboloy Department of General Electric Co., Detroit, let's consider what she is demonstrating. It is the amount of shrinkage involved in sintering powdered metal parts. The intricate chrome carbide part on the left is before, and the one on the right, after (in case you still aren't focussing exactly), and the amount of shrinkage is about 40 per cent. This particular part is for equipment used in testing high-temperature materials at temperatures of 1800 to 2000 degrees F.

Another Transfer-matic by Cross

**Bores, Faces, Drills
and Assembles
2 Types of
Flywheel Housing
Assemblies**



- ★ Processes 2 parts at a time for 2 different engine models.
- ★ Rough and finish turns and faces engine and transmission mounting faces; drills, bores, chamfers, reams and taps all holes; assembles center bearing and 2 dowels; finish bores and inspects center bearing after assembly; washes, dries parts for final assembly.
- ★ 314 pieces per hour at 100% efficiency.
- ★ 20 stations: 1 loading; 10 machining; 2 assembling; 4 inspecting; 2 cleaning; 1 unloading.
- ★ Pre-set tools to reduce downtime for tool changing.
- ★ Complete interchangeability of all standard and special parts for easy maintenance.
- ★ Other features: Construction to J.I.C. standards; hydraulic feed and rapid traverse; hardened and ground ways; automatic lubrication.



Established 1898

THE **CROSS** CO.
DETROIT 7, MICHIGAN
Special MACHINE TOOLS

A Mechanical Eye...



Ford Cuts Tool Costs with Cross Machine Control Units

One of the
Cross Machine Control Units
at Ford Motor Company's
Cleveland Engine Plant

(U. S. Patent Nos. 2679038
and D-163935. Others pending).

According to records, 221 Cross Machine Control Units in operation at Ford Motor Company Plants are assisting them greatly in improving tool trouble conditions.

One reason for this is that the Machine Control Unit provides a definite and convenient place for storing tools . . . tools which are pre-set so they can be placed in operation immediately without making machine adjustments.

Another reason is that the Cross Toolometer, an integral part of the Machine Control Unit, provides a standard for the performance of the tools, thereby enabling corrective action to be taken when necessary. The Toolometer dial is set to indicate the number of pieces which a given tool should produce. When the dial has reached that pre-determined figure, the machine automatically shuts down and the tools are changed. At the same time, other tools indicated by the Toolometer as approaching the end of their usefulness are also changed to take full advantage of the machine shut down.

The Cross Machine Control Unit is helping to keep Ford production going and is also assisting greatly in controlling tool life.

Established 1898

THE **CROSS** CO.
DETROIT 7, MICHIGAN
Special MACHINE TOOLS

News

OF THE INDUSTRY

California and Texas

CLEVELAND TAPPING MACHINE Co., Canton, Ohio, has announced the appointment of **HOFFMAN & HEARTT**, 3005 S. Grand Ave., Los Angeles, Calif., as its representative for southern California and Arizona; and **C. F. BULOTTI MACHINERY Co.**, 475 Fourth St., San Francisco, Calif., as its representative for the northern section of California.

EDGAR K. JOHNSTON has been elected vice-president of manufacturing and **JOHN R. EASTMAN**, chief engineer, of **Sterling Electric Motors, Inc.**, Los Angeles, Calif.

THOMAS E. WILLIAMS, in addition to his present duties as superintendent of the Los Angeles, Calif., steel service plant of **Joseph T. Ryerson & Son, Inc.**, Chicago, Ill., has



Thomas E. Williams, general superintendent of Joseph T. Ryerson & Son, Inc., West Coast plants

been appointed general superintendent of the company's West Coast plants on a staff basis.

PRATT & WHITNEY Division Niles-Bement-Pond Co., West Hartford, Conn., has announced the appointment of the **Tri-Tex Machine & Tool Co.**, Houston, Tex., as its representative in the South Texas area. They will handle and service the company's lines of machine tools, cutting tools, precision gages, Kellerflex machines and burrs.

GLENN O. LOGAN has been promoted to division manager of the Atlantic Sales Division of **Cleco Division of Reed Roller Bit Co.**, Houston, Tex.

Illinois

BARBER COLMAN Co., Rockford, Ill., announces the following sales department changes in its Wheelco Instruments Division: **THOMAS H. BEGGIN**, formerly with the Indianapolis, Ind., office, will now be associated with the Cleveland, Ohio, office; **ROBERT N. MILLER** of the Chicago office will now be located in the Los Angeles, Calif., office; **FRANCES H. BEAUPRE**, formerly of the Toronto, Canada, office, is now located at the Chicago, Ill., office; and **HOWARD P. BERGER**, who for many years was with the Cleveland, Ohio, office, has been placed in charge of the Detroit, Mich., office.

METRO TOOL & GAGE Co., Chicago, Ill., and **LAKE TOOL Co.**, Crystal Lake, Ill., have been acquired by **BESLY-WELLES CORPORATION**, Beloit, Wis., and will operate as divisions of the parent company from its headquarters. As a result of the recent purchase of the assets of these two firms, precision gages and carbide-tipped tools have now been added to the Besly cutting tool line.

BORG-WARNER CORPORATION, Chicago, Ill., announces the following executive appointments in the Mechanics Universal Joint Division, Rockford, Ill.: **FRANK W. RICKARD** has been made president and general manager of the Division. He succeeds **ARCH A. WARNER**, who recently retired. **CHESTER E. PALMER** was made executive vice-president.

MATTISON MACHINE WORKS, Rockford, Ill., announces the addition of a new Grinding Methods Laboratory equipped with major types of modern grinders for machining flat surfaces. The Laboratory introduces a new service to metal-working plants wishing to study production techniques, and manufacturers may submit parts for sample grinds.

EMERY R. WALKER, former manager of the service department of **Joseph T. Ryerson & Son, Inc.**, Chicago, Ill., has been appointed service consultant to the vice-president in charge of operations. **ROBERT D. ALLISON** has been named to the position vacated by Mr. Walker.

E. B. COTTINGHAM has been elected president of the **Henry Pratt Co.**, Chicago, Ill. He succeeds **S. B. SMITH**, who was elected chairman of the board of directors. Mr. Cottingham had been vice-president in charge of production since 1950.

AETNA BALL & ROLLER BEARING Co., a division of **Parkersburg-Aetna Corporation**, Chicago, Ill., announces the appointment of **WILLIAM E. HORENBURGER** as sales manager and **KENNETH R. COWAN** as plant manager of the Division.

DONALD E. WINGATE has been made chief engineer of **Ipsen Industries, Inc.**, Rockford, Ill. His duties will include the coordination of engineering and technical development programs now in process.

WILL JAHR of Decatur, Ill., has been appointed representative for the **Vascoloy-Ramet Corporation**, Waukegon, Ill. Mr. Jahr will handle the company's line of cutting tools in central Illinois.

FRANK MACHAC has been promoted to the position of plant superintendent of the **Shakeproof Division** plant, Illinois Tool Works, Des Plaines, Ill. Mr. Machac started to work for Shakeproof in 1936.

SAMUEL S. CRANDELL has been appointed office manager for the **Chicago, Ill.**, plant of **Joseph T. Ryerson & Son, Inc.**, Chicago, Ill. He succeeds **RICHARD J. OETKING** who has resigned.

SAMUEL C. WAGNER has been made assistant to general sales manager **JOHN E. MENZ** for **Kaiser Aluminum & Chemical Corporation**, Chicago, Ill.

Michigan and Wisconsin

GEAR GRINDING MACHINE Co., Detroit, Mich., announces the appointment of the following distributors for their recently developed single-spindle automatic screw machine: **AMERICAN CAM Co., Inc.**, Hartford, Conn., will service the entire New England area; **GUTHERY MACHINE TOOL CORPORATION**, Long Island City, N. Y., will cover metropolitan New York, New Jersey, Pennsylvania, and Fairfield County, Conn.

GREER HYDRAULICS, INC., New York City, announces the removal of its Detroit, Mich., office to new and larger quarters at 21329 Woodward Ave., Detroit.



(Left) Harry F. Vickers, vice-chairman of the board; (center) Kenneth R. Herman, president; and (right) Dr. N. E. Edlefsen, vice-president of engineering.

VICKERS INCORPORATED, Detroit, Mich., announces the election of the following officers: **HARRY F. VICKERS** has been appointed vice-chairman of the board; **KENNETH R. HERMAN** has been made president; and **DR. N. E. EDLEFSEN** has been made vice-president of engineering.

TAFT-PEIRCE MFG. CO., Woonsocket, R. I., has appointed **ROY R. WINN** district manager of the company's Detroit, Mich., sales office. He will be assisted by **K. THOMAS BRYANT**, sales engineer. **F. CURTIS FALES** replaces Mr. Winn as midwestern sales engineer.

ROBERT L. MURMAN has been made Detroit, Mich., district sales manager for the Wright Hoist Division of American Chain & Cable Co., Inc., York, Pa. He will make his headquarters at 601 Stephenson Bldg., Detroit.

MICHIGAN BROACH CORPORATION, Detroit, Mich., has appointed as sales representatives the **ALISON MACHINERY CO., LTD.**, Windsor and Toronto, Ontario, Canada, and **N. W. DORR CO.**, Chicago, Ill.

INDUSTRIAL EQUIPMENT CO., Joplin, Mo., has been appointed an authorized Carboly carbide tool distributor by Carboly Department of General Electric Co., Detroit, Mich.

GEORGE CAMERON has been appointed director of engineering; and **GORDON COOK** has been made supervisor of broach engineering of the Colonial Broach & Machine Co., Detroit, Mich.

CHARLES J. CANNON has been appointed manager of the Federal Contracts Sales Division of Vickers Incorporated, Detroit Mich. He joined the company in 1944.

FIRTH STERLING, INC., Pittsburgh, Pa., has appointed the Boyer-Campbell Co., Detroit, Mich., its industrial distributor in the Detroit area.

KEARNEY & TRECKER CORPORATION, Milwaukee, Wis., has made the following appointments: **J. ROBERT JONES** has been named general sales manager of the company, and **JOHN R. JOERGER** has been named sales manager of the new Aircraft Machine Division.

R. F. EDGAR has been made industrial sales manager of the Warner Electric Brake & Clutch Co., Beloit, Wis. He joined the company in 1947 and was made midwest regional manager for the firm. His headquarters will be in the Beloit offices.

JOHN W. SHIER was made assistant general manager of Acheson Colloids Co., Port Huron, Mich., and **BART C. DICKEY** has been promoted to fill Mr. Shier's former position as production manager.

New England

CUSHMAN CHUCK CO., Hartford, Conn., announces the appointment of the **PEARCE-DENGEL TOOL CO.**, 181 Boulevard, Hasbrouck Heights, N. J., as its representative in northern New Jersey, metropolitan New York and as far north as Poughkeepsie. This territory was formerly covered by **C. B. KOPECKY**, who is now located at State Tower Bldg., Syracuse, N. Y., and will represent Cushman in upper New York State.

HANSON-WHITNEY CO., Division of Whitney Chain Co., Hartford, Conn., announces the appointment of **B. W. SWANSON** as general manager, and **R. W. GRADY** as sales manager—small tools. Mr. Swanson has been with the company since 1925, and

previous to his current appointment, he served as factory manager. Mr. Grady joined the organization in January 1955 as national factory field representative.

AMERICAN BRASS CO., Waterbury, Conn., has announced that construction of a new plant has begun at Mattoon, Ill. This factory will manufacture flexible metal hose and tubing. Completion is expected by January 1956. The Mattoon unit will be managed by **RALPH C. DONOVAN**.

LEONARD F. SWOYER has been made eastern regional sales manager for the New Departure Division of General Motors Corporation, Bristol, Conn. Mr. Swoyer succeeds **ROBERT H. WILKIE**, who has become merchandising manager for the Division.

HARRINGTON MACHINERY, INC., West Hartford, Conn., announces the following executive appointments: **FREDERICK J. LANZ** and **JOHN P. FINN**, formerly sales engineers for the company, have each been elected a vice-president.

ROBERT E. GIAUQUE has been appointed to the position of works manager and chief engineer of the **E. HORTON & SON CO.**, Windsor Locks, Conn. He will be responsible for the operation of the company's two manufacturing divisions.

FRED W. ELYA has retired from the Norton Co., Worcester, Mass., after completing a career of forty-three years with the firm. For the last ten years, he has been northeastern district manager. **RONALD W. PRICE** has been named district manager for abrasive sales in all New England states. **ROBERT H. LANGDON** has been appointed district manager for a new sales district which includes New York State and northern New Jersey.

Hundreds of New Stock Sizes **SIMONDS** Flat Ground **DIE STEEL**



Widest Selection Ever Offered

Now you can get hundreds of new stock sizes of Simonds high-grade, precision-ground tool and die steel. Sizes that formerly were special are now available from stock at regular prices. Sizes you asked for to help you save time and money. "1001 sizes for 1001 uses" in either OIL or AIR Hardening type steel.

OIL HARDENING TYPE — Non-deforming, spheroidize-annealed for best machinability and consistently uniform hardenability — from Simonds' own steel mill. Extra-smooth finish with all decarburization and surface defects removed. Wide hardening range. Individually packaged (18" and 36" lengths) with simplified heat treating instructions.

AIR HARDENING TYPE — Non-deforming, spheroidize-annealed, 5% chrome — more wear-resistant yet easy to machine and heat treat with uniformly excellent results — another product of Simonds' steel mill. Extra-smooth finish with all decarburization and surface defects removed. Wide hardening range. 36" lengths. Individually packaged with heat treating instructions.



**FREE
WALL
CHART**

Ask your Simonds Distributor for a copy of this New Chart (18" x 31") giving full range of Stock Sizes now available.

**For Fast Service
from
Complete Stocks**



Call your

**SIMONDS
Industrial Supply
DISTRIBUTOR**

Factory Branches in Boston, Chicago, San Francisco and Portland, Oregon
Canadian Factory in Montreal, Que. Simonds Divisions: Simonds Steel Mill, Lockport, N. Y.
Simonds Abrasive Co., Phila., Pa., and Arvida, Que., Canada

**SIMONDS
SAW AND STEEL CO.**

FITCHBURG, MASS.

UNION TWIST DRILL Co., Athol, Mass., announces the appointment of JOHN C. MOLINAR to succeed W. E. LOY as general sales manager of the company. Mr. Loy will continue as treasurer. Mr. Molinar was formerly vice-president, general sales manager, and director of the Niles-Bement-Pond Co., in charge of sales, sales promotion, and advertising activities of Pratt & Whitney Division.

JOHN W. WHEELER has been appointed an abrasive engineer by the Norton Co., Worcester, Mass. He will cover western Massachusetts, succeeding ROBERT H. LANGDON, who has been appointed district manager for New York State and northern New Jersey.

SIMONDS SAW & STEEL Co., Fitchburg, Mass., has made arrangements to operate the manufacturing plant of HELLER BROTHERS Co., Newcomerstown, Ohio, under the name of the HELLER TOOL Co., subsidiary of Simmonds Saw & Steel Co.

HUGH J. MCKANE has been promoted to district manager of the southern area for the Bay State Abrasive Products Co., Westboro, Mass.

FELLOWS GEAR SHAPER Co., Springfield, Vt., announces the following sales changes: CARL S. RICE has been named sales manager of the Cutter Division; J. F. HRONEK has been named sales manager of the Plastics Division; and GEORGE H. SANBORN, general sales manager.

ABRASIVE MACHINE TOOL Co., East Providence, R. I., announces the following executive changes: WALTER P. R. SCHEELS has been promoted from sales manager to assistant to the president; and JOSEPH T. VINBURY, general sales manager.



(Left) Walter P. R. Scheels, assistant to the president, Abrasive Machine Tool Co.; (right) Joseph T. Vinbury, general sales manager

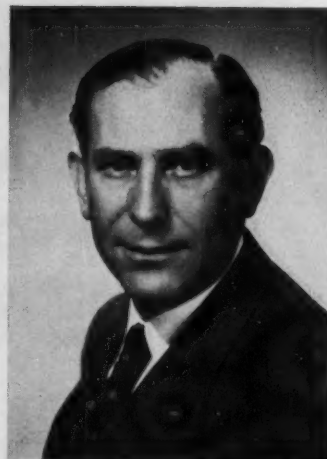
GEORGE R. MORIN has been made manager of industrial engineering, Marketing Division of Jones & Lamson Machine Co., Springfield, Vt.

New York and New Jersey

OAKITE PRODUCTS, INC., New York City, has announced the appointment and transfer of several technical service representatives: WILLIAM H. DUCKWORTH is now serving the metal industries in South Milwaukee and replaces R. J. BALTZELL, who has been transferred to the Elmira, N. Y., territory; GEORGE F. BECKER is the representative in Kansas City, Mo., replacing OTTO W. JOMMERSBACH, who has been transferred to the Brooklyn-Queens area in New York City; RAYMOND ABZIA is a representative in Newark, N. J.; H. WILDER, transferred to the Akron, Ohio, territory, has been replaced in LaCrosse, Wis., by R. P. LIND; and W. D. HUDSON, transferred to Peoria from Topeka, Kan., is being replaced by D. R. COWELL.

RUSSELL, BURDSALL & WARD BOLT AND NUT Co., Port Chester, N. Y., announces the following new plant managers: LAMBERT M. KASPER will manage the Rock Falls, Ill., plant, succeeding WILLIAM H. HOOFSTITLER, who is retiring after forty-six years of service with the company; ROBERT J. MCCOMBS succeeds Mr. Kaspers as plant manager in Coraopolis, Pa.; and WILLIAM C. MCILVAIN succeeds Mr. McCombs as superintendent at Coraopolis.

DAVID SWAN has been appointed director of research, Metals Research Laboratories, Electro Metallurgical Co., Niagara Falls, N. Y., a division of Union Carbide and Carbon Corporation, New York City.



Alfred Fleissig, general sales manager, Loewy-Hydropress

ALFRED FLEISSIG has been appointed general sales manager of Loewy-Hydropress, New York City. Mr. Fleissig has been connected with the company since its inception, having worked originally in sales and, for the past fifteen years, in charge of purchases and contracting. He will retain his position as director of purchasing.

H. E. B. MACHINE TOOLS, INC., Lansing, Mich., has moved its executive and sales offices from New York City to new and larger headquarters at 708 Clare St., Lansing, Mich. The move now centralizes all operations in Lansing where the company's Pilot automatic copying lathes and other special lathes are made.

SPERRY CORPORATION, New York City, has been consolidated with Remington Rand, Inc., Buffalo, N. Y., to form the Sperry Rand Corporation. Ford Instrument Company Division of the Sperry Corporation will continue to be operated as before but under the name of Ford Instrument Co., Division of Sperry Rand Corporation.

GRISWOLD A. PRICE has been appointed assistant vice-president of sales of the western area for the United States Steel Corporation, New York City. Mr. Price succeeds HERBERT J. WATT, who has retired after forty-three years as a sales executive.

WILLIAM J. GRANT has been appointed southern sales manager for railroad products for the American Brake Shoe Co., New York City. Mr. Grant will be located at the company's sales office in Norfolk, Va.

WALTER J. NILES has been elected president, treasurer, and director of KRAUS AUTOMATIC MACHINES Co., Rochester, N. Y., and its two wholly owned subsidiaries.

Swanson

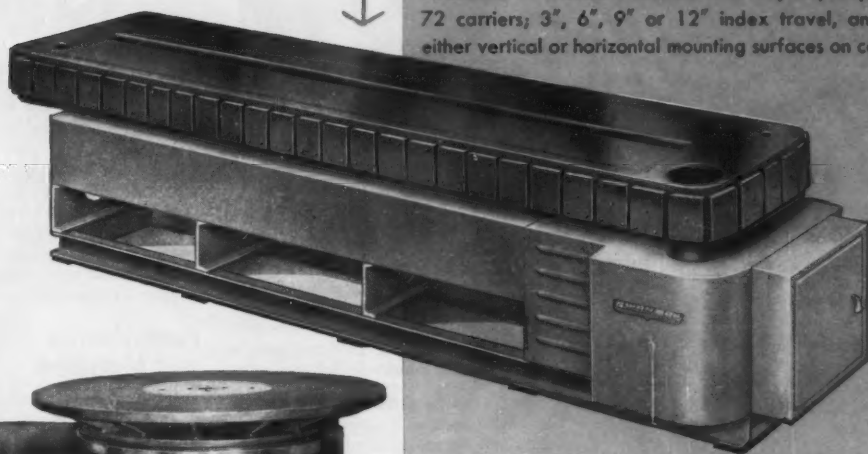
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standard, basic machine chassis for automation ...to cut costs and shorten completion time for special purpose machines.

①

THE AUTO-TRAN Transfer Type Indexing Unit.

Available in standard models with 48, 54, 60, 66 or 72 carriers; 3", 6", 9" or 12" index travel, and with either vertical or horizontal mounting surfaces on carriers.



②

THE SERIES H (large) Turret Indexing Unit.

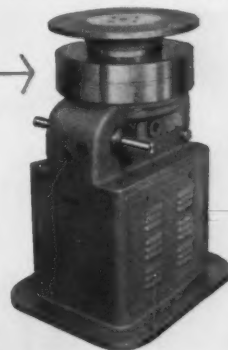
Offered with a wide choice of turret diameters to 72"; with 8, 12, 16, 24 or 32 index positions, and a complete range of indexing rates and dwell times. Exclusive Swanson turret lock assures accurate positioning at each work station.



③

THE SERIES B-C (medium) Turret Indexing Unit.

Standard models include turret diameters to 40"; 6, 8, 12, 16, 18, 24 or 32 index positions and a complete range of indexing rates and dwell times. Also features the exclusive Swanson turret lock.



If an automation program is in your present or future plans, write, wire or phone for full details on these units and other standard Swanson components and accessories.

Quality

SWANSON
TOOL & MACHINE PRODUCTS INC., ERIE, PA.

Since 1919

ENGINEERS and BUILDERS of AUTOMATIC and SPECIAL PURPOSE MACHINES

AMPCO METAL, INC., Milwaukee, Wis., has appointed as distributors KENCROFT ASSOCIATES, INC., Buffalo, N. Y., and ONTARIO METAL SUPPLY, INC., Rochester, N. Y.

GOULD & EBERHARDT, INC., Irvington, N. J., announces the following executive changes: H. EZRA EBERHARDT has been made chairman of the board; GUSTAVE E. SPIES has been named president; and F. G. EBERHARDT and W. C. EBERHARDT have each been made a vice-president.

ADAMAS CARBIDE CORPORATION, Kenilworth, N. J., announces the following appointments: JOHN A. ZURA has been appointed service engineering manager for the midwest area. HARTWELL & Co., Houston, Tex., has been appointed representative in the Southwest.

Ohio and Indiana

AMERICAN BRAKE SHOE Co., New York City, has purchased the DENISON ENGINEERING Co., Columbus, Ohio. Denison now becomes a wholly owned subsidiary of the company. W. C. DENISON will remain as president and chief executive officer of the company and no changes will be made in management or operations.

HYDRAULIC PRESS MFG. Co., Mount Gilead, Ohio, announces the selection of five executives: WILLIAM H. BENNETT has been made vice-president in charge of sales, having joined the company in 1939; J. W. ARNOLD has been made vice-president in charge of manufacturing; WILLIAM N. WOODWARD has been made secretary-treasurer; ROBERT J. LINDSEY ing; and GLEN R. PITTMAN has been made sales manager of the Hydraulic Power Division.



(Left) William H. Bennett, vice-president in charge of sales; (right) J. W. Arnold, vice-president in charge of manufacturing of the Hydraulic Press Mfg. Co.



Curtis B. Hoffman, vice-president of sales for Brush Electronics Co.

CURTIS B. HOFFMAN has been appointed vice-president of sales for the Brush Electronics Co., Cleveland, Ohio. In addition to his administrative duties, Mr. Hoffman will direct marketing of the company's industrial and research instruments.

RELIANCE ELECTRIC & ENGINEERING Co., Cleveland, Ohio, announces the following assignments in its sales organization: PETERSON NESBIT has been transferred to the sales office in Boston, Mass., as a sales engineer in the New England district; and CHARLES ROBERT SARGEANT has been assigned as a sales engineer to the New York office.

WALTER J. BEMB has been made vice-president in charge of customer relations of Aluminum Industries, Inc., Cincinnati, Ohio.



TIMKEN ROLLER BEARING Co., Canton, Ohio, announces the following changes in its sales offices: A new plant has been established in Columbus, Ohio, and R. L. WILLIAMS has been named district manager; B. C. PRICE succeeds Mr. Williams at the St. Thomas, Ontario, office; L. H. GEGENHEIMER, assistant district manager in Cleveland, Ohio, has been named district manager to replace J. W. WEIR, who has retired; and D. O. SCHEETZ, field engineer, will remain in Cleveland to assist Mr. Gegenheimer.

NATIONAL AUTOMATIC TOOL Co., INC., Richmond, Ind., has made the following appointments: RALPH COX has been appointed Buffalo regional manager; LOU MAEF has been made supervisor of West Coast dealer activities in Los Angeles; JOHN STAMBACK has been made sales engineer for the Cleveland area; WALTER MCKENZIE has been moved to Philadelphia as sales engineer; KEN GORTON has been assigned as sales engineer to the Detroit office; and MAER FRANKS has been appointed sales engineer at the Chicago office.

Pennsylvania and Maryland

T. J. WINTER has been appointed assistant sales manager of the Wright Hoist and Ford Elock Divisions, American Chain & Cable Co., Inc., York, Pa. Mr. Winter joined the Wright Hoist Division in 1947, and most recently served as district sales manager for the Detroit, Mich., and Cleveland, Ohio, areas.

ALAN WOOD STEEL Co., Conshohocken, Pa., has announced the purchase of the Steel Equipment Division of the Penn Metal Corporation, Philadelphia, Pa. The Penn Metal Corporation will continue to operate its Highway Products Division. The new acquisition will be known as the Penn Metal Products Division of Alan Wood Steel Co.

DELTA POWER TOOL DIVISION, Rockwell Mfg. Co., Pittsburgh, Pa., has made the following sales promotions: BYRON E. COON has been named sales promotion and merchandising manager of the Division and JOHN P. MACCROSSEN has been named regional manager of the western region, succeeding Mr. Coon.

ALUMINUM COMPANY OF AMERICA, Pittsburgh, Pa., announces three major sales appointments: LEWIS P. FAVORITE, manager of product sales; FREDERICK J. CLOSE, manager of market development; and W. S. MCCHESENEY, manager of industry sales.

FIRTH STERLING, INC., Pittsburgh, Pa., has appointed the following district carbide service engineers: R. W. GUENTHER, Birmingham, Ala.; D. P. CAMERON, Hartford, Conn.; and JACK GLENDAY, Los Angeles, Calif.

ANOTHER EXAMPLE of
REDUCING COSTS WITH—

Buhr

ECONOMATION

Performs 23 operations
every 18 seconds on
automotive intake
manifold!



This Buhr 5-way dial-type hydraulic-feed Special mills, drills, countersinks and individual-lead-screw taps 206 intake manifolds an hour gross.

The Machine is equipped with a Buhr 60"-diameter 6-position automatic index table, complete with shot bolt.

Chips are disposed automatically by means of a rotating chip conveyor.

Parts are loaded one per station in each of the six single-place fixtures. Power wrench with torque-control, automatically operates clamping mechanism.

Buhr's precision manufacturing methods provide complete interchangeability of all parts and component assemblies.



Buhr

MULTIPLE-SPINDLE
HIGH PRODUCTION MACHINERY

See what Buhr Economation can do to reduce your production costs. A phone call, wire or letter will bring you a prompt consultation with one of our top sales executives.

BUHR MACHINE TOOL CO.

ANN ARBOR, MICHIGAN

Solidly Engineered • Precision Built • for World's Leading Manufacturers



(Left) Earle Boyer and (right) Thomas J. Kniff, Jr., both sales managers for Kennametal, Inc.

KENNAMETAL, INC., Latrobe, Pa., announces the following sales appointments: THOMAS J. KNIFF, JR., Cleveland, Ohio, sales branch manager, will become central district manager for the firm in Detroit, Mich. Mr. Kniff succeeds GILBERT A. BUNN, who has been assigned to the firm's home office. EARLE BOYER has been made manager of the Cleveland, Ohio, sales branch.

VANADIUM-ALLOYS STEEL Co., Latrobe, Pa., has opened a new tool bit department which is located in the company's new building just east of the main mill in Latrobe.

DR. CARL B. POST, head of the metallurgical and research departments, has been promoted to vice-president in charge of metallurgy for Carpenter Steel Co., Reading, Pa.



Dr. Carl B. Post, vice-president of metallurgy, Carpenter Steel Co.

E. H. SCHOONMAKER, formerly associated with the St. Louis, Mo., office has been appointed eastern district sales manager for the Baldwin-Lima-Hamilton Corporation, Philadelphia, Pa. He will make his headquarters at 60 E. 42nd St., New York City. Also, W. A. MCKNIGHT of the company's Houston, Tex., office, has now been made manager of the sales office at 1221 Locust St., St. Louis, Mo.

JOHN H. ISLAND and KENNETH E. WHITEKETTLE have been appointed sales managers; and JAMES BALLARD, special brush representative, for the Baltimore, Md., Brush Division of the Pittsburgh Plate Glass Co., Pittsburgh, Pa.

Canada

MICHIGAN DRILL HEAD Co., Detroit, Mich., has announced that BARKER INDUSTRIAL EQUIPMENT, LTD., Toronto, Ontario, Canada, will serve as its exclusive sales and service representative for all the Canadian provinces.

Obituary

WILLIAM F. ZIMMERMANN, executive vice-president for Gould & Eberhardt, Inc., Irvington, N. J., died on July 9 at the age of seventy-one years. Born in Newark, N. J., Mr. Zimmermann, joined the firm in 1900 as an apprentice and worked his way up to the position he held at the time of his death. He was chief engineer of the company for many years and had been granted more than 100 patents for machine tools and related mechanisms manufactured by the company.

Coming Events

SEPTEMBER 6-17—Machine Tool Show sponsored by the NATIONAL MACHINE TOOL BUILDERS' ASSOCIATION to be held at the International Amphitheatre, Chicago, Ill. Further information can be obtained from Clapp & Poliak, Inc., 341 Madison Ave., New York 17, N. Y.

SEPTEMBER 6-17—PRODUCTION ENGINEERING SHOW, coinciding with the Machine Tool Show, to be held at the Navy Pier, Chicago, Ill. For further information, write to Clapp & Poliak, Inc., 341 Madison Ave., New York 17, N. Y.

SEPTEMBER 6-17—METALWORKING MACHINERY AND EQUIPMENT EXPOSITION to be held at the Coliseum, Chicago, Ill. Further information can be obtained from Chester L. Wells, general manager, 2689 East Overlook Road, Cleveland 6, Ohio.

OCTOBER 17-21—National Metal Exposition and Congress sponsored by the AMERICAN SOCIETY FOR METALS at the Convention Halls, Philadelphia, Pa. Further information from American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio.

OCTOBER 23-26 — Semi-annual meeting, AMERICAN GEAR MANUFACTURERS ASSOCIATION at the Edgewater Beach Hotel, Chicago, Ill.

NOVEMBER 14-18—Chicago Exposition of Power and Mechanical Engineering, under the auspices of the AMERICAN SOCIETY OF MECHANICAL ENGINEERS, in conjunction with their Seventy-fifth Anniversary Meeting, to be held in the Chicago Coliseum, Chicago, Ill. Further information can be obtained from the International Exposition Co., 480 Lexington Ave., New York 17, N. Y.

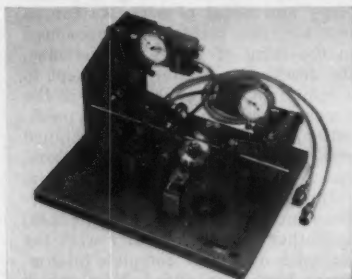
Information Wanted for "Directory of Metalworking Machinery"

The Department of Defense has announced that a contract has been awarded for a revision of "Directory of Metalworking Machinery". This directory, in addition to its primary purpose of inventory control, is widely used as a basic reference by both governmental and civilian procurement activities. It would, therefore, be to the advantage of all manufacturers of non-portable cutting, and forming metal-working machines to supply up-to-date information on their products, both current and discontinued, for listing in the Directory. Data should be mailed to the Assistant Secretary of Defense, (Supply and Logistics), Washington 25, D. C., Attention: Production Equipment Branch.

Ask **FEDERAL**

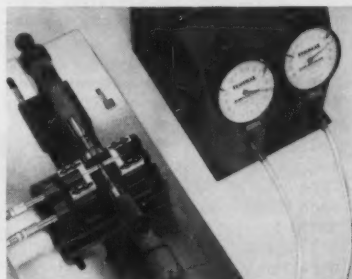
**FOR ANYTHING
IN MODERN GAGES**

Automatic Gages



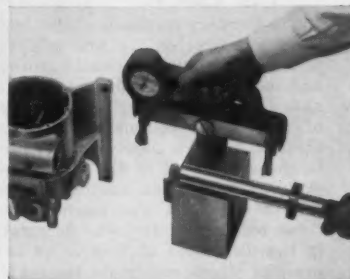
Gage continuously checks width and thickness of square wire travelling seventy feet a minute.

Air Gages

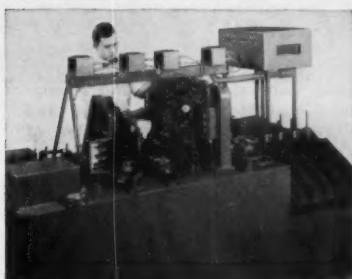


The amount of taper on a small shaft is determined by two 5,000 to 1 Dimensionairs with AirProbes. Measurements are in increments of .000020".

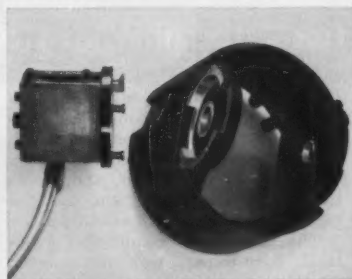
Mechanical Gages



Indicator Gage checks squareness of horizontal bores in relation to vertical bores. Gage shown is being applied to master.



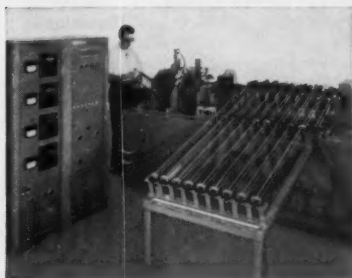
In-Process Gage measures twenty separate dimensions on thirteen different sizes of fabricated stator blades. Discards off-sizes.



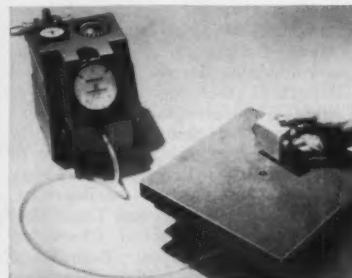
Dimensionair Gage measures a very shallow inside diameter. Frictionless motion-transfer unit contacts AirProbe which takes actual measurement.



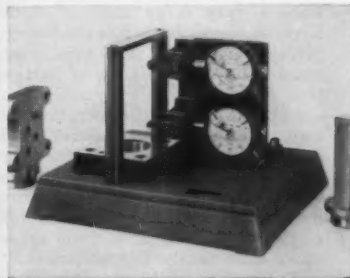
Parallelism of the two lower holes with the large hole, and with each other, is checked on this specially designed fixture.



Automatic Sorting Gage sorts valve stems for length, diameter, head thickness, hardness, out-of-round, and taper — at 2400 per hour.



Air-Flatness Gage. AirProbe projects from black granite surface plate. Accurate to .000050" in any 2 x 2 ft. area.



Dual-purpose Indicating Gage shows (1) squareness of face with flange and (2) distance from centerline to edge of face. Barrier protects contacts.

Whatever your gaging requirements, it pays to check with Federal.

**RETURN THE
COUPON**

TODAY!

**Federal Products Corporation
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Providence 1, R. I.**

Please send information:

- ☐ Automatic Gages
☐ Air Gages
☐ Mechanical Gages

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New Books and Publications

INDUSTRIAL LUBRICATION PRACTICE

By Paul D. Hobson. 548 pages; 6 by 9 inches; 167 illustrations; 45 charts and tables. Published by THE INDUSTRIAL PRESS, 93 Worth St., New York 13, New York. Price, \$8.

The primary emphasis of this book is on practice; on the practical application of sound lubrication theory and methods to the efficient maintenance and operation of a wide range of mechanical equipment and machinery. Enough theory is presented in the early part of the book, however, to provide an adequate basis for the reader's understanding of those technical references necessary in the discussion of techniques and practice which constitute the major part of the work.

As stated in the preface, the intention is to provide basic information on lubrication practice that can be used by the technical man who may have received his training and previous experience in some other field, and that will serve as a foundation for the body of specialized knowledge that he is building up. There would seem to be no question but that any man who has the responsibility of maintaining and operating machinery, whether it be in a large manufacturing plant or in a small shop, would benefit greatly from a wider knowledge of lubrication principles, methods and equipment and the practical ways in which they can be applied to his particular field.

The scope of the work is somewhat wider than just that of lubrication, since a very large number of the troubles that the lubrication engineer may be called in to rectify are not, in fact, due to faults of lubrication but are rather symptoms of some fault in machine operation, design, or construction. A considerable amount of information is therefore given about the general operation of various kinds of equipment, prime movers and machinery and the difficulties which may arise from causes other than faulty lubrication.

The book provides a most informative survey of the many oils, greases, and solid lubricants, both natural and synthetic, that are now available and points out their specific advantages and disadvantages as well as the applications for which each is best suited. The different kinds of plain and anti-friction bearings that are used in present-day machinery are described together with the ways in which they function. The approved methods of supplying lubricants to all types of bearings and the fittings, accessories, and equipment which make it possible to do the job efficiently are covered in a comprehensive and thorough manner.

A separate chapter is devoted to each type of prime mover and a great deal of down-to-earth information taken from actual operating experience is given which make these particular chapters of unusual interest and value to the operating engineer. Important factors in the lubrication of industrial machinery and equipment for metal forming and metal cutting are presented and the various coolants used in metal-cutting operations are described. A handy reference chart shows which coolants are recommended for each type of cutting operation and for each type of ferrous and non-ferrous metal to be cut.

The organization of a lubrication department with an efficient storage arrangement and an economical selection of lubricants for the various equipment is gone into in detail.

The reader will find much useful information about the deterioration of oil during its use, the decomposition products that are formed and their effects on the machine in which the lubricant is being used. The various kinds of contaminants and the manner in which they may be introduced into the lubrication system are also covered. Ways in which gravity separation, centrifuging, and filtration equipment can be employed to purify used oil are fully described.

The author has compiled a practical, easy-to-use, working manual which answers a host of lubrication questions and provides invaluable assistance in solving many baffling difficulties in machine operation which arise from the lubricating system and from other causes. A large number of working charts and tables increase the usefulness of the book as a reference source. A glossary of important technical terms and a table of abbreviations are provided.

The wide scope of the book will be apparent from the following list of chapter titles: Principles of Lubrication; Running In New Bearings; Types of Lubricants and Their Use; Physical and Chemical Characteristics of Lubricants; Methods of Lubricant Supply; Plain Bearings; Anti-friction Bearings; Organization of a Lubrication Department; Storage and Handling of Lubricants; The Purification and Reclamation of Oil; Hydraulic Systems and Equipment; Electric Motors and Generators; Two-stroke Gasoline Engines; Four-stroke Gasoline Engines; Diesel Engines; Compressors; Refrigeration Equipment; Pneumatic Tools; Reciprocating Steam Engines; Steam Turbines; Metal-Forming Machines; Metal-Cutting Machines; Cutting Fluids; Gears for Power Transmission; Chains, Ropes, Belts, and Couplings; and Storage Preservation of Machinery.

METALS REFERENCE BOOK. Edited by Colin J. Smithells. Second edition. Two volumes with a total of 967 pages, 6 by 9 1/2 inches. Published by Interscience Publishers, Inc., 215 Fourth Ave., New York 3, N. Y. Price, \$25.

The text is designed to provide in thirty-seven sections a convenient summary of data relating to metallurgy and metal physics. As far as possible, the material is presented in the form of tables or diagrams, the descriptive matter being kept to a minimum. The book, which is the American edition of a British publication, is the result of the combined work of the editor, associate editors, and a large number of contributors.

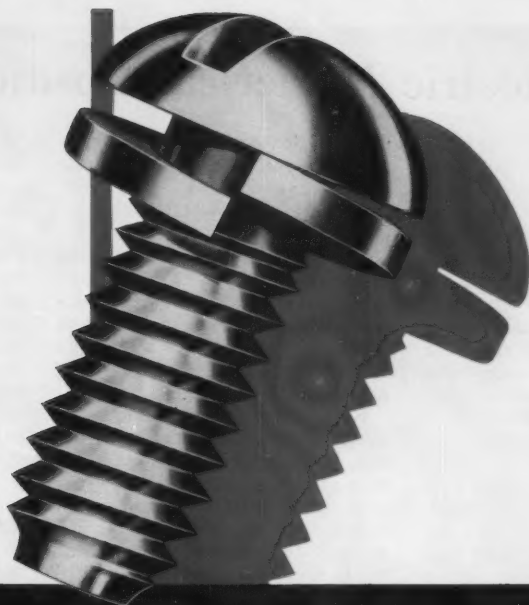
In this second edition several sections have been entirely re-written, and other sections together with the inclusion of a more complete bibliography have been added. New values have been substituted in the tables whenever recent determinations or more reliable data have become available, and the equilibrium diagrams have been greatly enlarged and expanded.

Volume I contains the following list of contents: Introductory Tables; General Physical and Chemical Constants; Atomic Nuclei and Their Properties; Line Spectra of the Elements; X-Ray Crystallography; Crystallography; Crystal Chemistry; Geochemistry; Metallography; and Equilibrium Diagrams.

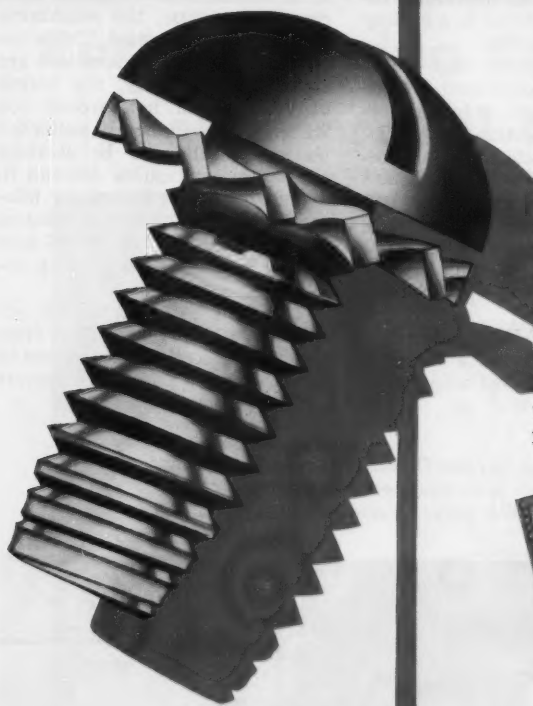
Volume II discusses the following: Gas-Metal Systems; Diffusion in Metals; Elastic Properties and Damping Capacity; Thermochemical Data; Physical Properties of Molten Salts; General Physical Properties; Thermoelectric Properties and Temperature Measurement; Radiating Properties of Metals; Thermionic, Photoelectric and Secondary Emission; Electrical Properties; Steels and Alloys with Special Magnetic Properties; Mechanical Testing; Mechanical Properties of Metals and Alloys; Hard Metals; Deep Drawing Properties; Lubricants; Friction; Casting Alloys and Foundry Data; Refractory Materials; Fuels; Carbon and Graphite Electrodes; Controlled Atmospheres for Heat Treatment; Corrosion; Electroplating and Metal Finishing; Welding; Solders and Brazing Alloys; and Miscellaneous Data.

* * *

A gage for use in the sheet metal shop or pattern shop quickly scribes lines of specified distances from a reference edge. A parallel line can be rapidly drawn with the device from 1/8 to 1 inch from the edge, in the more common fractional increments. It is being offered free, when requested on company letterhead, by the Dayton Rogers Mfg. Co., Minneapolis 7, Minn.



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General Electric Numerical Positioning Control

An automatic control system which uses punched business machine cards to control machine tools has been announced by the Specialty Control Department, General Electric Co., Waynesboro, Va. Called "Numerical Positioning Control," the system is adaptable for use on a wide variety of machine tools including riveting, milling, boring, and drilling machines, as well as punch presses, lathes, and shears. It is claimed that the control can double or triple the productivity of many machines on which it is installed, depending on the application involved. It can also increase the accuracy of work that is produced.

The control reads positioning directions from punched holes in standard business machine cards. The directions are converted into positioning signals which direct the machine to the correct machining location. This is done through a system of command and pick-up selsyns. As the first card is read, the machine positions itself accordingly, and the operation takes place. Meanwhile, the next card is read and the machine moves to its next position. At the same time the machine is being positioned by the control, directions are also being read from the punched cards. These directions are conveyed to the machine to initiate action in coordination with the positioning movements.

Normally, the machining operation would take place immediately after the machine reaches the cor-

rect position—while the next card is being read. In some applications, however, such as a lathe, machining occurs during the positioning motion. If desired, therefore, the machining may take place before the next positioning occurs. Three motions are automatically controlled in a typical operation. However, additional motions may be performed if they are required.

Standard card processing equipment is used for punching, sorting, and stacking. Positioning information is punched into the cards in decimal form and is not coded. This permits the operator to read directions right from the card. Each card, as it is placed into the standard card reader, or director, Fig. 1, contains complete information for at least one machining operation. The cards also have adequate space for a considerable number of miscellaneous directions, such as operator's instructions, in addition to a variety of machine functions.

Machine directions that would normally be programmed include tool selection and indexing, sequencing of operation, and initiating of automatic material handling cycles. Once the cards are correctly punched and placed into the machine, the operator has only to push the start button and the machine automatically runs through the sequence of operations required.

The Numerical Positioning Control system contains a director, control panel, position selsyn pick-

up units for each motion, and direct-current motor drives for each motion. The control panel includes the electronic and magnetic circuits required to compare the command selsyn systems and the feed-back selsyn signals, as well as controls to direct the direct-current drive motors. To provide positioning control, the machine director angularly positions the rotors of the command selsyns, in accordance with the punched card information. Each command selsyn is electrically connected to a position-sensing selsyn, which is geared directly to a controlled machine number.

The rotor voltage of the command selsyns is proportional to the angular positioning error between the two electrically connected selsyns. Thus, correct positioning is accomplished by moving the machine member until this positioning error is zero. As soon as all members have reached their correct positions, the machining operation is performed. This cycle is repeated until all operations are completed. Normally, the length of motion will not exceed 450 inches. However, nearly unlimited motion lengths can be attained should the application demand it. Speeds up to 500 inches per minute are offered, and accuracies as close as plus or minus 0.0005 inch can be maintained, depending upon the speed.

The control can be built to approach the desired positions from the same direction—regardless of direction of travel. This feature

Fig. 1. (Left) Operator loading director of General Electric's Numerical Positioning Control. Fig. 2. (Right) Rotary-turret punch press equipped with automatic control system. Operator is pressing button on director





Rush Stamping Company gives stamp of approval to Cities Service



Some of Rush's Stampings awaiting shipment. The rapidly growing, 4½ year old firm makes parts for auto hot water heaters, brake levers, vacuum cleaners, and air conditioning units.



Chief Engineer Fred W. Selter switched to Cities Service drawing oil a year ago. He praises it for eliminating need for many compounds, preventing build-up on dies, and lowering costs.

Praises Cities Service drawing oil as timesaver, worksaver, moneysaver.

The four and a half year old Rush Stamping Company of Toledo, Ohio, has already grown into a sizeable operation. Producing stampings for air conditioning units, vacuum cleaners and automotive parts, the company utilizes 41 punch presses ranging from 35 to 400 tons in pressure.

Like many other stamping companies, Rush was using a variety of paste type compounds for its drawing operations and suffering the penalty of heavy costs and build-up on dies which such compounds inflict. Then, a year ago, they switched to Cities Service drawing oil.

Here are the results in the words of F. W. Selter, Chief Engineer: "Now one Cities Service Oil does our variety of jobs, completely eliminating previous number of products and compounds required. This oil prevents build-up on dies formerly created by our paste type compounds, and in some applications saves as much as 50% in costs over these compounds. In addition, Cities Service has eliminated supply problems by offering us local warehousing and engineering services."

Learn more about Cities Service drawing oils which have already received the stamp of approval from so many firms. Talk with a Cities Service Lubrication Engineer. Or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.

CITIES SERVICE

QUALITY PETROLEUM PRODUCTS

reduces positioning error caused by backlash. All positions are measured from a zero reference point, rather than from a previous position, to help prevent any possibility of cumulative position error.

Completely automatic, the control reduces material spoilage, since the human element is eliminated and dimensions are consistently held within required tolerances. All positioning normally occurs simultaneously, thus decreasing positioning time. When required, positioning can occur in a pre-selected sequence. The punched, standard business machine cards can easily be stored and re-used when needed. Operations can be changed by punch-

ing the cards with a hand punch, or else they can be eliminated by coded punches. Identical operations can be performed on different machines, or at various plant locations, by preparing duplicate sets of cards.

The control is capable of easy application, and little machine modification is necessary to adapt it for use. Its main application, however, will be by machine tool manufacturers who will apply it directly to new machines, rather than to have it installed on equipment already in use. An operator is shown in Fig. 2 pressing a button on the director of a Numerical Positioning Control on a rotary-turret punch press.

Indicate Item 250 on postcard, page 325

Schrader "Lub-Air-Ator" for Protection of Air-Operated Tools, Cylinders and Valves

A combination air filter, regulator, and lubricator designed for low-cost protection of air-operated tools, cylinders and valves, has just been released to the trade by A. Schrader's Son, Division of Scovill Mfg. Co., Inc., Brooklyn, N. Y. This "Lub-Air-Ator," as it is called, is fully automatic and can be easily cleaned and serviced without removal from the pipe line. The filter unit has a large-area sintered-bronze filter, baffle plate, and a drain cock for blowing out water and accumulation of foreign matter.

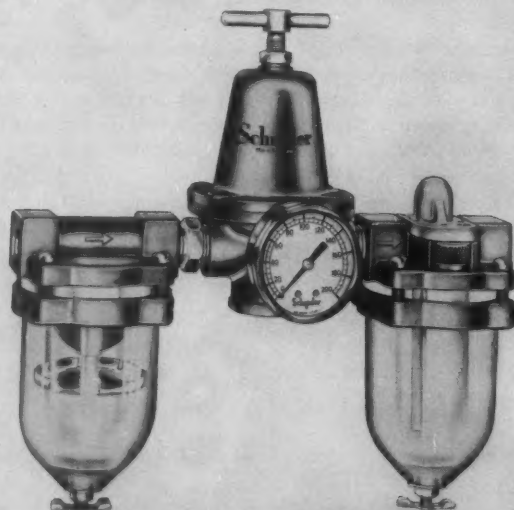
The regulator can be used to adjust the air flow from 250 pounds per square inch inlet pressures down to 5 to 125 pounds per square inch by simply turning the regulator handle. The pressure

gage can be mounted at the front or rear of regulator. A vibration-proof adjustment thumb wheel permits the oil flow to be regulated from a steady flow down to intermittent drops as needed. The transparent bowl holds a half pint of oil. Refilling is done through a special built-in sliding seal port without shutting off the air flow.

Another special feature of the lubricator is the "sight feed" which permits users to see if oil is flowing in desired quantities. The "Lub-Air-Ator" is available in three sizes for 1/4-, 3/8- and 1/2-inch N.P. threads. The filter, regulator, and lubricator are also available as individual units or in pairs.

Indicate Item 251 on postcard, page 325

Schrader "Lub-Air-Ator" for air-operated tools, cylinders and valves



Indicator or pilot light of oil-tight construction for heavy-duty service

"Dialco" Oil-Tight Indicator Lights

A series of "Dialco" indicators or pilot lights of oil-tight construction, designed for severe heavy-duty industrial service, is being introduced to the machine building industry by the Dialight Corporation, Brooklyn, N. Y.

An outstanding feature of the lights is the special provision for retained oil-resistant gaskets. Glass lenses are available in several shapes with omnidirectional light spread. Units having discs (with words, letters, or numbers) that can be inserted behind flat glass lenses to deliver specific messages can be supplied. A wide range of incandescent lamps, with screw or bayonet base, as well as several neon type lamps, can be accommodated. A full range of lens colors are available. The units can be mounted in either a 1 3/16-inch or 1-inch clearance hole. Optical details permit an assembly to fit any conditions.

Indicate Item 252 on postcard, page 325

New Research Center Open to Show Visitors

The Verson Allsteel Press Co., Chicago, Ill., will open its plant and new research and development center to visitors at the Machine Tool Show. The center has been established for the purpose of continuing research on the forming and cold-working of metals on press equipment. A complete Bonderizing line, tumbling equipment, and an experimental press shop that contains presses from 100 to 3000 tons are included.

In addition, the company will show several machines on their erection floor. The largest of these is a 2500-ton double-action press having a bed area of 90 by 208 inches.

CUSHMAN chucks

give

Chuck-ability

CHUCK-ABILITY: The ability to SPEED your work
... ELIMINATE fatigue ... IMPROVE your products
... and REDUCE your costs ... through design
and selection of the right work-holding devices.

... in these **4 NEW** Chucks to be introduced at the

PRODUCTION ENGINEERING SHOW

BOOTHS 419-421

September 6-17

Navy Pier, Chicago, Ill.

1 ACCRA-SET CHUCK

designed for minute accuracy with simple, quick adjustment; will repeat to within .0005" T.I.R.

2 AIR OPERATED COMPENSATING CHUCK

offers maximum or controlled compensation, plus standard self-centering operation.

3 SCROLL OPERATED COMPENSATING CHUCK

having wide range of compensation while retaining the main scroll bearing.

4 AIR OPERATED SCREW ADJUSTABLE JAW CHUCKS

incorporating positive locking, permitting accurate, repetitive chucking.

THE CUSHMAN CHUCK COMPANY

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a world standard for precision



CUSHMAN CHUCKS ... A Product of American Quality, Labor and Materials.

SEE YOUR INDUSTRIAL DISTRIBUTOR

manufacturers of:

Air Operated Chucks, Cylinders, and Accessory Equipment ... The Cushman Power Wrench ... Cushman Manually Operated Chucks and Face Plate Jaws.



Top Carriage Key to Stepped Up

**Both tracer and
cam-actuated models
set top marks on
tough turning jobs.
Unobstructed fronts
simplify loading
and unloading**

A COMPLETE line of production lathes designed and engineered by Hydra-Feed Machine Tool Corporation, meets even the toughest production turning requirements—often eliminating additional machines and extra operations. Outstanding features of the basic lathe design are adaptability to multiple tool or tracer turning, ease of loading and automation, full use of carbides, high metal removal rate and smoothness through massive design.

Included in the modern lathe line are four automatic lathes using multiple tooling and three tracer lathes. All seven standard machines feature an unobstructed front for loading, unloading or checking without interference from tools, slides, hoses, etc. Their elimination results from the distinctive Hydra-Feed design that mounts tools on top and rear carriages. Additional tooling can be mounted on a platen.

Newest additions to Hydra-Feed's line are three production tracer lathes. Here the design permits mounting of the tracer slide and template well above

| HYDRA-FEED SPECIFICATIONS | | | | |
|---------------------------------------|-------|--------|--------|---------|
| | HD-8* | HD-12* | HD-16* | HD-24 |
| Swing Over Top Carriage | 11½" | 14" | 17" | 24" |
| Length Between Centers | 24" | 36" | 48" | Chucker |
| Max. Motor HP Recommended at 1800 rpm | 30 | 50 | 100 | 75 |

*Dimensions also apply to tracer lathes in these sizes.

Roughing and finishing SAE 4620 steel forgings for automotive stem pinions on two Model HD-12 lathes takes one less operator and one less machine than former method. Finish is better for grinding, too.

Both tracer slide and template are located well above work on Hydra-Feed tracer lathes getting rid of the chip and dirt problem. Auxiliary rear carriage does "extra" work like facing, grooving, etc.

the work preventing chips or dirt getting on the slide or stylus.

When facing, grooving, chamfering, etc. are required, these "extra" operations are performed by an auxiliary rear carriage at the same time as the contour is being traced. Contour facing and turning are similarly handled by auxiliary tooling.

Standard automation equipment can be used with either type of lathe. Work can be brought right up to the machine and loaded into position without interference and goes straight out the back through the opening in the bridge that holds the top carriage.

Although Hydra-Feed lathes remove metal in large volume, chips are no problem. A full-length,



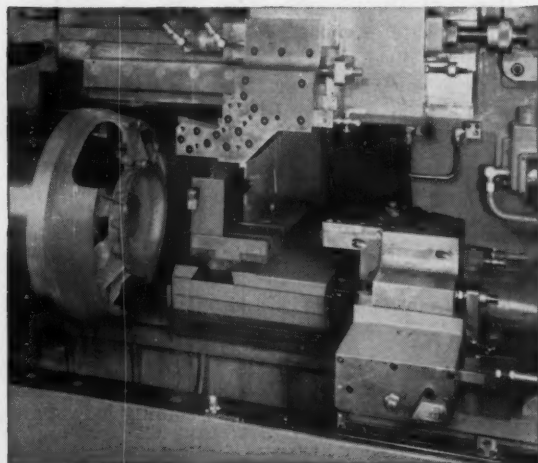
full-depth chute provides chip capacity not found on conventional lathes. Chips fall freely below and do not pile up in the work area. An opening provided at machine rear permits most standard automatic chip disposal units to be used.

Machine Tool Show visitors can see a Hydra-Feed doing copy turning in Ohio Machine Tool Company's Booth 301. These lathes, designed and engineered by Hydra-Feed, are built in the Ohio plant.

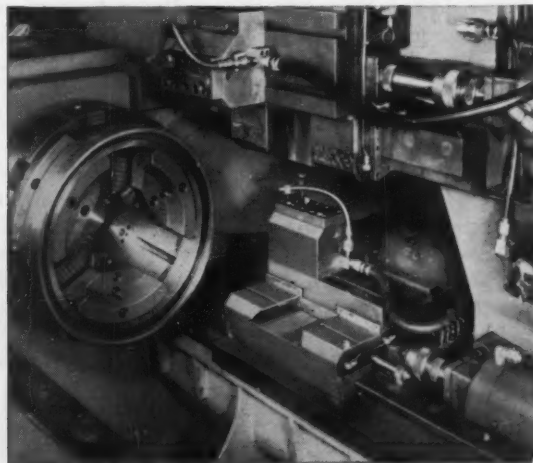
Additional information about either the tracer or cam-actuated automatic lathes is available from Hydra-Feed Machine Tool Corporation, 730 W. Eight Mile Road, Ferndale 20, Michigan. (Advertisement)

Lathe Performance

Maximum utilization of tooling permits a single automatic lathe to be used for roughing and finishing cast magnesium alloy jet engine housing. Note special finger chuck for holding part during machining and platen for finish facing.



Two tools, on top and rear carriage, rough a 1-in. wide, 2¼-in. deep groove in tank transmission ring in 3 minutes. Job is done on Model HD-24 lathe, one of five set up in a line to do all machining on both sides of SAE 8740 steel ring.





Talking With Sales Managers

By **BERNARD LESTER**
Management Consulting Engineer

School Bells Are Ringing

THIS month school bells ring for all of us—figuratively at least. Have you, Mr. Sales Manager, laid out an orderly man-development program for your sales engineers? Quick to set sales bogies and check business obtained, we too often neglect training men to reach goals.

Approach training programs for the active sales engineer in these four ways:

1. Serial letters from the sales manager to each salesman.
2. Periodic meetings for sales engineers
3. Formal night courses given by educational institutions
4. Scheduled discussions between the sales manager and individual sales engineers.

An adequate man-development program includes all four of these points. Let us try to evaluate each.

Serial Letters to Sales Engineers—To be effective, sales letters should be planned in advance, tailored one to another, with space left in each for last-minute current news.

Vital subjects are plentiful—sales reasons, sales techniques, sales tools, new applications, competitive gossip, market changes and so on. Place yourself in the field and imagine what would help you. Add to each letter items of personal accomplishment. Call for reactions of salesmen so that the letter will not merely be read, initialed, and filed. Avoid verbosity—your sales promotion manager can assist in the art of crisp and vivid expression.

Periodic Sales Meeting—Sales meetings can produce marked results. They permit the quick interchange of ideas and provide inspiration. A roving sales force timed by customer needs cannot afford to meet very frequently. Hence plan these meetings carefully and see that every moment counts. Outside speakers are desirable. They can inspire and inform. But never let them be an escape from planning and leadership.

Demonstrations can liven sales meetings, provided they illustrate some vital points. Movies,

slides, and models are especially helpful. Make sure the mechanics of demonstration are rehearsed. Recall some past meetings? How often were men primed to see and listen to slides, films, or sound reproductions, only to have the projector stick, film break, or the reproducer either remain silent or pierce your ear drums? The greatest benefits from such meetings result from open discussion, provided each man is primed.

Night Courses of Instruction—In most populous communities, colleges or other institutions provide night courses valuable to the sales engineer. The courses may be on technical subjects, salesmanship, or public speaking. Economics or psychology help to broaden and inspire the sales engineer.

One company which specializes in making investment castings, urges its sales engineers to take courses in metallurgy, salesmanship, and public speaking. Knowing that the outlay is worth-while, it pays the cost of tuition. The men are cautioned to take one evening course a week, for in a burst of fall enthusiasm, some men attempt more evenings only to tire before the semester is over.

Personal Discussions—The form of training most neglected by the sales manager is that of individual discussion with his men. Nothing helps the sales engineer more than an intimate friendly discussion of his particular problems in selling.

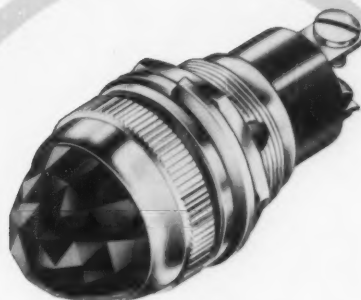
When you visit the field, reserve a portion of your time for personal conferences in which the focus is on the training needs of the man. Analyze the characteristics of the individual man and talk with him on his own level.

Many sales managers act too much as pinch hitters, unintentionally blocking the development of the individual sales engineer. Man-development is a key to capable sales management. One way to appraise the coming salesman is to observe his reaction to any training plan.

NEW **DIALCO** INDICATOR LIGHTS

**for HEAVY DUTY
Industrial Applications**

*Exceptionally Rugged
Adaptable—Effective*



ESSENTIAL FEATURES OF DIALCO'S OIL-TIGHT INDICATOR LIGHTS

- One-piece Solid Brass Mounting Bushing
- Fully Gasketed with Oil-proof Gaskets
- All Gaskets Retained—No Loss of Seal
- Solid Brass Knurled Lens Holder with Gasketed Lens
- Omnidirectional Permanent Color Glass Lens
- High Impact Phenolic Insulation
- Rugged Terminals—Binding Screw Type
- Single Hole Mounting—1" or 1 1/4"
- Incandescent or Neon Lamps—Screw or Bayonet Type

OIL TIGHT

DUST TIGHT

OMNIDIRECTIONAL

with torpedofaceted lens
(as shown above)

How COMPLETE OIL-TIGHTNESS is achieved by Dialco's new streamlined design:

The heavy flange of the 1-piece solid brass bushing is undercut to receive the resilient gasket, assuring that it will not squeeze out when compressed in mounting. The hexagonal brass nut and spring washer make mounting easy, permanent, oil tight and dust tight.

LENS CAP IS PERMANENTLY OIL TIGHT: Made of a single piece of brass, the lens cap is threaded to screw on to the mounted assembly. Externally it is heavily knurled to make removal easy. The glass lens fits into the open end of the cap to rest on a shoulder provided with an intervening resilient gasket. The lens is secured by turning over the open end — which COMPRESSES THE GASKET and MAKES IT PERMANENTLY OIL-TIGHT!

OIL-TIGHTNESS of the lens cap is completed by making an oil-tight fit at the bushing when it is screwed on. To do so, the projecting part of the bushing is undercut to remove the threads where the seal is to be made. This also **RETAINS THE GASKET** on this part where it will not be lost when the cap is removed for lamp replacement. In order that the gasket will not be squeezed out when it is compressed, the open end of the cap is counter-bored to receive and retain it.

DIALCO'S streamlined, compact OIL-TIGHT Pilot Lights offer many more advantages — such as molded phenolic sockets, rugged terminals, choice of 7 lens colors — and others too numerous to list here. The following pages provide additional data. To complete the "oil-tight" picture, avail yourself — NOW — of this feature of DIALCO service:—

Samples for Design Purposes on Request at Once—No Charge

Foremost Manufacturer of Pilot Lights

DIALIGHT
CORPORATION

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HYACINTH 7-7600



OIL TIGHT INDICATOR LIGHTS



Torpedo
Faceted Lens

3 LENS STYLES



Dome Lens

INDICATOR LIGHT ASSEMBLIES to accommodate 6S6 INCANDESCENT LAMPS

For 6S6 with SCREW BASE

| Lens style | Catalogue No. |
|---------------------|---------------|
| Torpedo faceted | 103-3101-1331 |
| Dome (frosted back) | 103-3101-1211 |

For 6S6 with BAYONET BASE

| Lens Style | Catalogue No. |
|---------------------|---------------|
| Torpedo faceted | 103-3502-1331 |
| Dome (frosted back) | 103-3502-1211 |

These 2 types of
incandescent lamps
may be used:

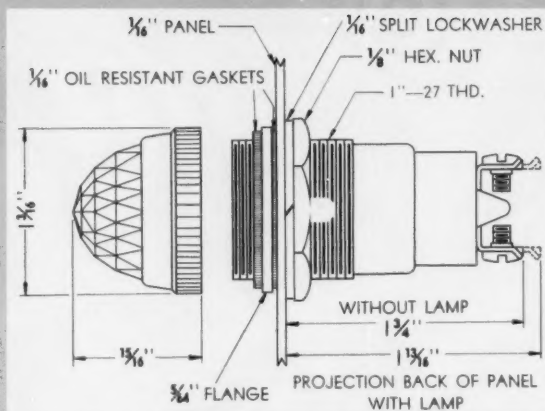


SCREW



BAYONET

Order complete with lamp;
specify lamp number.



Required dimensions for Cat. No. 103-3502-1331 are shown by the above drawing. A very slight variation in front and back projection for other units.

LENS COLOR: The final figure in the catalogue number indicates that the lens has RED color. When color other than red is desired, change this digit to a figure from the listing below. Note that white lenses are translucent and are always furnished unfrosted (For example: 103-3502-1235).

Green—2 . . Amber—3 . . Blue—4 . . White—5
Yellow—6 . . Clear—7.

OTHER OIL-TIGHT SERIES by DIALCO

Dialco can supply larger pilot lights with larger lens areas, and suitable for other lamps, with the oil-tight features of this group. Still other oil-tight indicator lights are available for 11/16" mounting hole, suitable for the NE-51 neon glow lamp (with built-in resistor) and also for low voltage incandescent lamps.

Samples for Design Purposes
on Request at Once — No Charge

Foremost Manufacturer of Pilot Lights

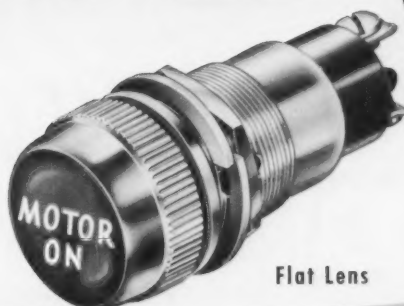
DIALIGHT
CORPORATION

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HYACINTH 7-7600

OIL TIGHT INDICATOR LIGHTS

DIALCO

RUGGED BINDING SCREW TERMINALS



Flat Lens

INDICATOR LIGHT ASSEMBLIES to accommodate 6S6 INCANDESCENT LAMPS

DISCS tell the story: In motor controlled equipment, Discs inserted behind lenses can be used to deliver specific messages. A significant safety feature!

For 6S6 with SCREW BASE

| Lens style | Catalogue No. |
|--------------------------------------|-------------------|
| Flat, frosted back (without disc) | 104-3101-211 |
| Flat, unfrosted back (with disc) | 104-3101-XP10-231 |

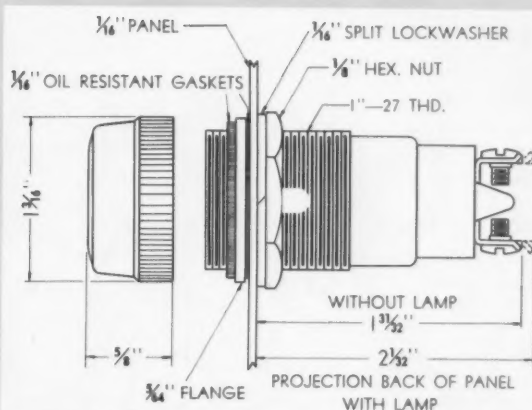
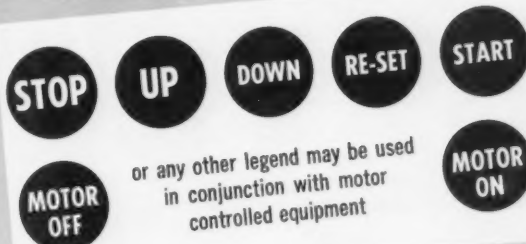
For 6S6 with BAYONET BASE

| | |
|--------------------------------------|-------------------|
| Flat, frosted back (without disc) | 104-3502-211 |
| Flat, unfrosted back (with disc) | 104-3502-XP10-231 |

LENS COLOR: The final figure in the catalogue number indicates that the lens has **RED** color. When color other than red is desired, change this digit to a figure from the listing below. Note that white lenses are translucent and are always furnished unfrosted (For example: 104-3502-235).

Green—2 . . Amber—3 . . Blue—4 . . White—5
Yellow—6 . . Clear—7.

Note: White—5 is "translucent" and cannot be used with a disc.



Required dimensions are shown by the above drawing.

Order complete with lamp; specify lamp number.

Adaptor Set—Cat. No. 1316: for mounting any assembly in 1-3/16" clearance hole

The Adaptor Set consists of a reducer (A) equipped with gasket (B) to fit the 1-3/16" clearance hole, which is sometimes standard, and a washer (C) for under panel mounting. This set makes it easy to use the streamlined 1" Dialco assembly where it is inconvenient to provide the smaller hole which it fits directly.

Provision of the retained gasket on the reducer assures the same oil-tightness that is obtained with Dialco assemblies mounted in the regular way.



Samples for Design Purposes on Request at Once—No Charge

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CORPORATION

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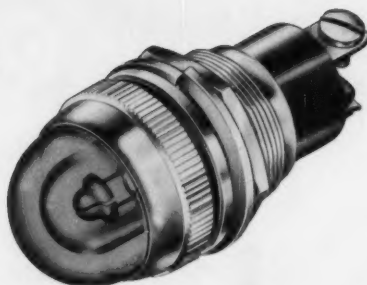
OIL TIGHT INDICATOR LIGHTS

A **DIALCO** EXCLUSIVE:

Built-in Resistor

(U. S. Patent — No. 2, 421, 321)

FOR NEON GLOW LAMPS



(Illustrations are approx. actual size)

This series of assemblies offers the convenience and flexibility of the use of the NE-48 lamp with the necessary current limiting resistor included in the assembly. Its value is selected to obtain the desired performance on the supply voltage with the proper balance between lamp life and brightness. The best choice will be recommended for any set of conditions.

On 105-125 volt circuits generally recommended resistance values are:

| | OHMS | APPROX. LIFE (HOURS) |
|---|--------|----------------------|
| For very long life | 30,000 | 7500 |
| For normal service | 15,000 | 2500 |
| For intermittent service and bright light | 10,000 | 1000 |

For NE-48 with Bayonet Base

(BUILT-IN Resistor—see table above)

Dome (unfrosted) 103-5406-1231

For NE-48 with Bayonet Base

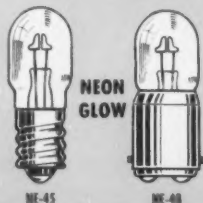
(External Resistor required—see table above)

Dome (unfrosted) 103-3506-1231

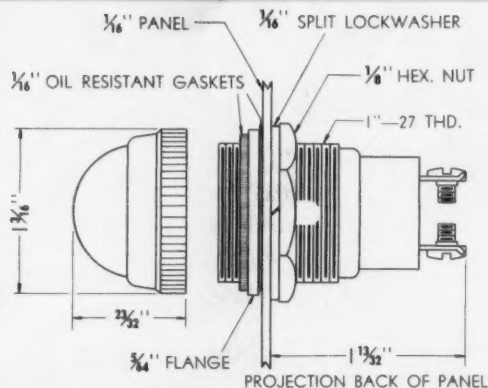
For NE-45 with Candelabra Screw Base

(Resistor BUILT-IN the lamp base)

Lens style Catalogue No.
Dome (unfrosted) 103-3114-1231



These 2 types
of Neon Glow Lamps
may be used



Required dimensions for Cat. No. 103-3114-1231 are shown by the above drawing. A slight variation in back projection only for other units.

LENS COLOR: The final figure in the catalogue number indicates that the lens has RED color. When color other than red is desired, change this digit to a figure from the listing below.

Green—2 . . Amber—3 . . Blue—4 . . White—5
Yellow—6 . . Clear—7.

Note: Green—2, Blue—4, and White—5 are not recommended for use with neon lamps.

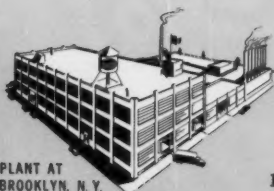
Order complete with lamp;
specify lamp number.

**Samples for Design Purposes
on Request at Once — No Charge**

Foremost Manufacturer of Pilot Lights

DIALIGHT
CORPORATION

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Printed in U.S.A.

*The American Sip Corporation
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Extend a Cordial Invitation
to Attend
a Continuous Demonstration of*



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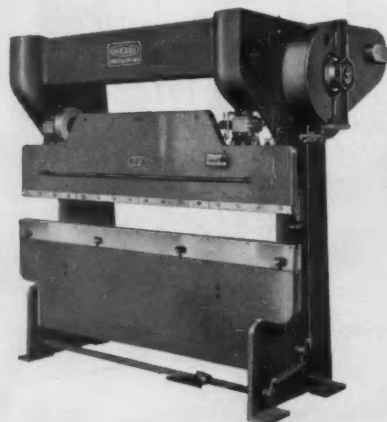
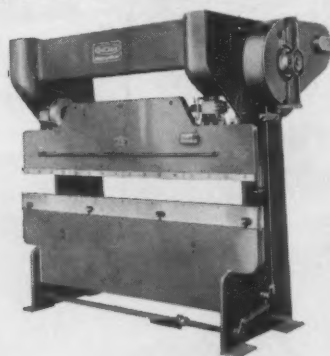
OPEN HOUSE and EXHIBIT

Every visitor to the great Chicago Machine Tool Show and Metalworking Machinery and Equipment Exposition is invited to Dreis & Krump's open house. This open house and exhibit will be conducted every day September 6 to 17, except Saturday and Sunday, from 9:00 A.M. to 5:00 P.M. Especially, those interested in forming, bending, punching, and notching sheet metal and the bending of steel plate for weldments, etc. will find it well worth their while to visit us.

Something new will be on display—shown for the first time—four new models of light duty press brakes. Also we shall have models of all types of CHICAGO equipment to demonstrate the bending of steel plate and the forming and bending of sheet metal. Our engineers will be available to discuss the application of this equipment to your requirements.

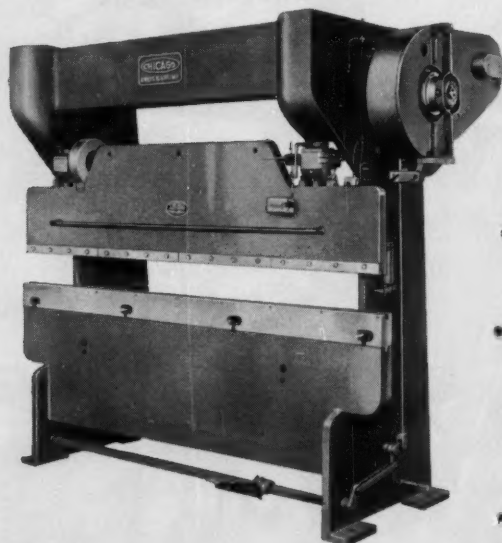
Plan now to attend this open house and exhibit.

New SERIES A
PRESS BRAKE



New SERIES B
PRESS BRAKE

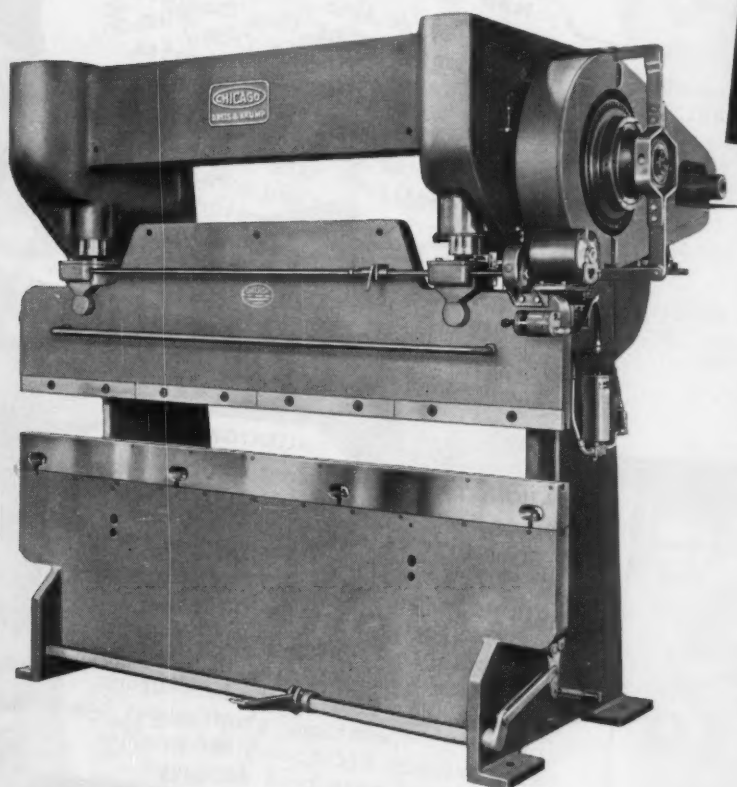
New SERIES C
PRESS BRAKE



Only 15 Minutes Taxi Ride
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DREIS & KRUMP PLANT

during the
CHICAGO MACHINE TOOL SHOW



New SERIES L PRESS BRAKE

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Daily 9:00 A.M. to 5:00 P.M.
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In Operation

Series D CHICAGO SS Press with 50"x172" die area, set up for performing over 50 punching and notching operations in a single stroke on a sectional cooler panel.

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Series D CHICAGO SS Press set up for continuous automatic production of No. 55 detachable-link sprocket chain—from coiled stock to complete chain without scrap.

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5829

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MANUFACTURING COMPANY, 7400 S. Loomis Boulevard, Chicago 36, Illinois



THE TREND TO

JAMESTOWN, N. Y.

SITUATION: Growing sales were taxing production capacity of tool mfr's. forge shop. Had four belt-driven board drop hammers.

SOLUTION: Four Ceco-Drops now in operation—have been giving excellent service. Production is up—maintenance is down. "3 hours charged against Ceco-Drops in 42 days".—"One Ceco-Drop ran 108 hrs. (21 days) without maintenance or die work."

COLUMBUS, O.

SITUATION: Job shop with 5 Board Drop Hammers finds equipment obsolete—cannot compete with lower prices and higher production of other more modern shops.

SOLUTION: Initiated 10 year program of modernization to include 15 Ceco-Drops. Three Ceco-Drops already installed to replace board drop hammers.

CHICOPEE, MASS.

SITUATION: The managers of one of the East's largest forge shops saw Ceco-Drops in operation in another plant. Decided on this type of hammer for their shop.

SOLUTION: Promptly ordered a 2,000 lb. Ceco-Drop and a 2,500 lb. Ceco-Drop. After a year's service their record was so good that two more 2,000 lb. Ceco-Drops were ordered. These latter are now in operation.

FLINT, MICH.

SITUATION: Large Auto Co. with 16 Board Drop Hammers—(7 of them Chambersburg "J's")—ranging in age from 7 to 30 years. Lowered production rates and mounting maintenance costs.

SOLUTION: Started modernization in 1953. Converted* four "J's" with Ceco-Drop upper works. Cost and down time reduced. Other "J's" to be converted*. Ceco-Drops will replace older board hammers. *Saves cost of anvil and foundation!

ALLENTOWN, PA.

SITUATION: Tool works had the problem of keeping 23 "old dog" board drop hammers operating profitably. Had but one recent model "J" Chambersburg Board Drop.

SOLUTION: Management launched a modernization program calling for nine Ceco-Drops capable of producing a yearly tonnage in excess of the 23 old board drop hammers. Four of the Ceco-Drops are now in operation, shop layout has been revised. Efficiency and production methods have been improved.

CHAMBERSBURG

CHAMBERSBURG

CECO-DROPS

SKOKIE, ILL.

SITUATION: One of largest manufacturers of hand tools is planning a new shop. Decided to have modern Gravity Drop Hammers.

SOLUTION: Selected Ceco-Drops, and on a programmed basis is replacing board drop hammers with Ceco-Drops. To date, two 2,000 lb. Ceco-Drops and one 2,500 lb. Ceco-Drop are in operation—"Doing fine".

LANSING, MICH.

Lansing, Mich. is unique among industrial cities in the concentration of drop forging activity in its many factories. It may well claim the title of "Drop Forging Capital of the World". In Lansing are six great forging shops covering 14 acres of land, with a working area of 985,579 sq. ft. All these great forging shops are using Chambersburg Ceco-Drops.

Forge Shop No. 1—installed the first Ceco-Drop in 1947—now forging connecting rods.

Forge Shop No. 2—has installed 5 Ceco-Drops since 1950—making automotive forgings.

Forge Shop No. 3—bought 4 Ceco-Drops since 1948—Commercial and automotive forgings.

Forge Shop No. 4—bought seven Ceco-Drops in the last six years.

Forge Shop No. 5—Purchased 3 Ceco-Drops in 2 years.

Forge Shop No. 6—One of largest in world. Installed 11 Ceco-Drops since 1951.

*... and remember
the Lansing Story?*



*The gravity drop hammer
with short stroke control*

ENGINEERING CO.

PENNSYLVANIA

See Cincinnati

**SHAPERS... SHEARS
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SEPTEMBER 6-17

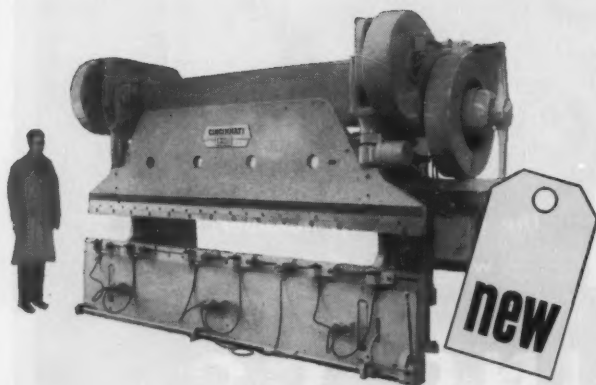
BOOTH 1105



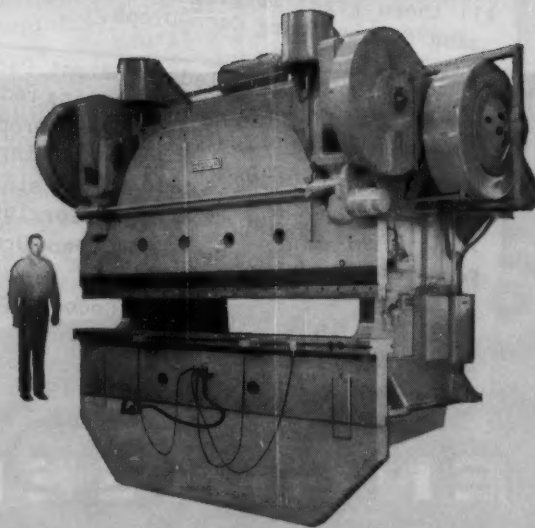
THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A.

SHAPERS • SHEARS • BRAKES



**9-115 x 10' CINCINNATI ALL STEEL PRESS
BRAKE, capacity 1/4" x 10' mild steel.**



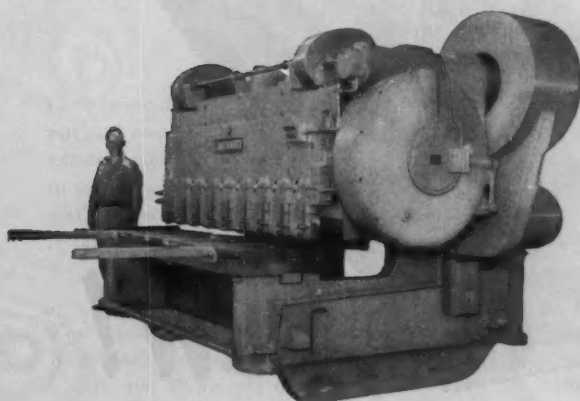
**50-900 x 12' CINCINNATI ALL STEEL
PRESS BRAKE, capacity 1" x 12' mild steel.**



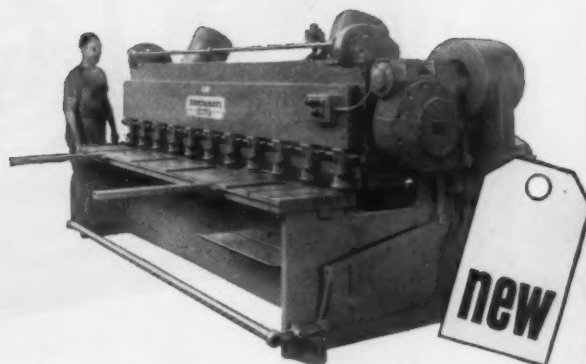
42" CINCINNATI ALL STEEL SHAPER,
16 cutting speeds, 25 to 400 FPM.



16" HEAVY DUTY CINCINNATI RIGID
UNIVERSAL SHAPER.



10008 CINCINNATI ALL STEEL SHEAR,
capacity 1" x 8' mild steel.



1410 CINCINNATI ALL STEEL SHEAR,
capacity 3/16" x 10' mild steel.

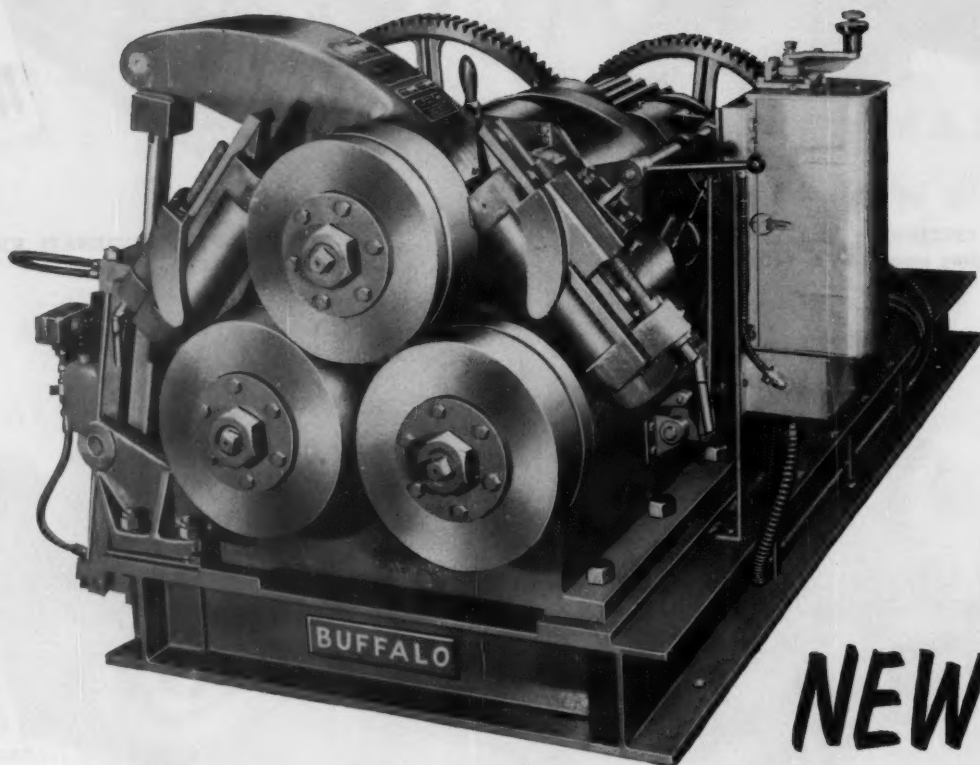


2-30 x 5' CINCINNATI ALL STEEL PRESS
BRAKE, capacity 30 ton or 14 gauge x 6'
mild steel.



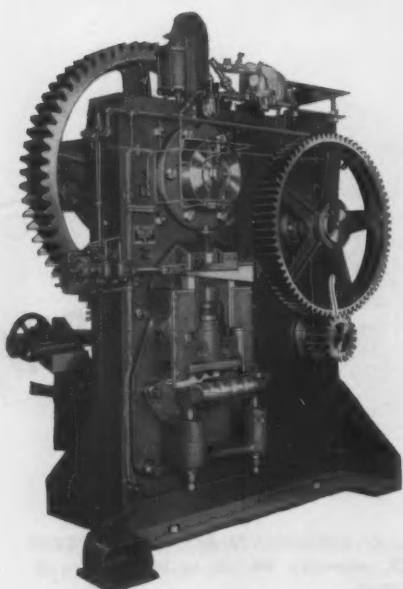
3-50 x 6' CINCINNATI ALL STEEL PRESS
BRAKE, capacity 50 ton or 10 gauge x 6'
mild steel.

See 'em **PERFORM**



NEW!

BENDING ROLLS with HYDRAULIC ROLL CONTROL !



Move a valve handle up and the upper roll is raised; move it down and the roll is lowered — hydraulically. This new feature in "Buffalo" Vertical Bending Rolls brings new speed and ease to your bending operations — cuts your time and costs in forming arcs, spirals, circles. Visit Booth 610 and see how quickly and easily the rolls can be set or released. Here's an important contribution to profits and productivity in metal bending!

"Buffalo" BILLET SHEARS

Here are the machines that speed up your preparation of forging stock and reduce waste by making clean, fast cuts with no smearing. And at Booth 610, you'll see "Buffalo's" first Hydraulic Billet Shear.

for you at the SHOW

at *"Buffalo"* BOOTH 610



NEW! THE INCOMPARABLE "RPMster"

Here is the drill for shops that want the *finest* — accuracy, high output and complete convenience. Its great new gearless drive offers an extreme range of spindle speeds from 100 R.P.M. to 3000 — adjusted in seconds. You'll have to see it and operate it in Booth 610 before you'll believe a drill can be so versatile, quiet, and vibrationless in operation!

"Buffalo" IRON WORKERS

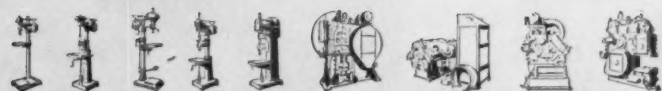
You'll also see how quickly the big "Buffalo" No. 1½ Structural Iron Worker shears, punches, notches and copes some of the heaviest structurals. "Buffalo" Universal Iron Workers, the "handiest machines in the shop" will also be displayed.

"Buffalo" DRILLS

Besides the "RPMster", you'll be able to see and operate other famous drills in the "Buffalo" line — the big 2" No. 22 Drill that handles as easily as small drills — the husky 1" No. 18 Drill that's a production favorite everywhere — and the highly accurate No. 16.



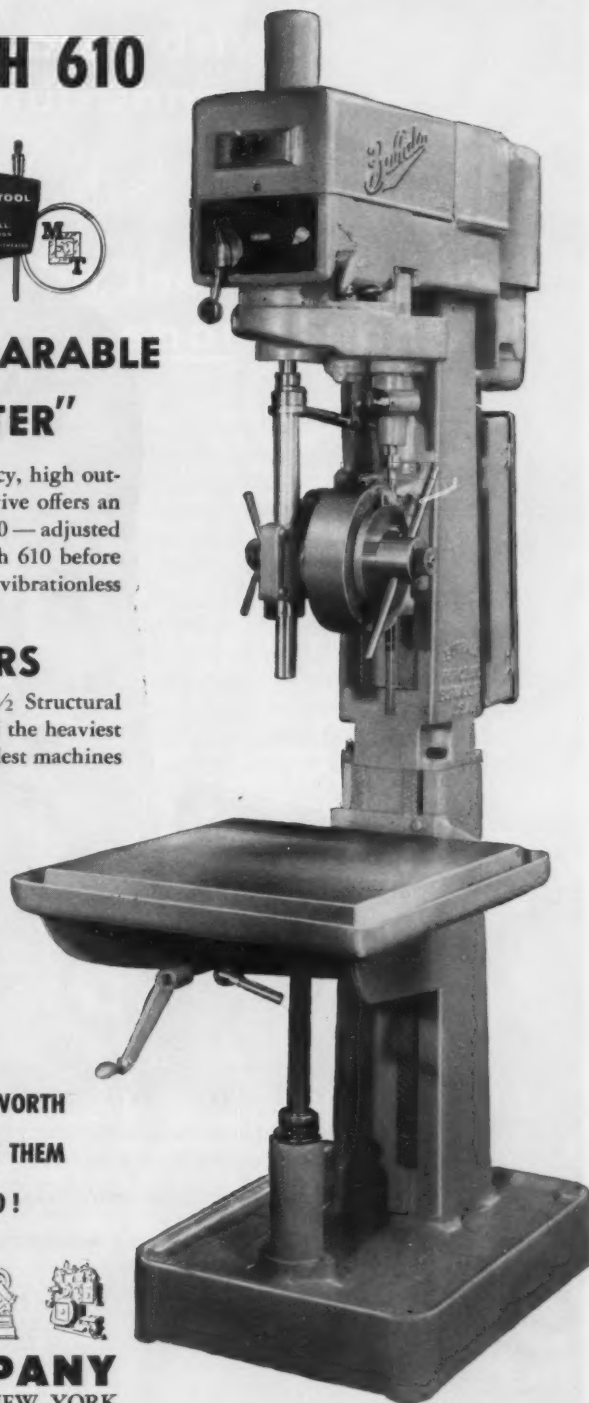
IT WILL BE WELL WORTH
YOUR TIME TO SEE THEM
ALL AT BOOTH 610!



BUFFALO FORGE COMPANY
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DRILLING • PUNCHING • SHEARING • BENDING



For more information on products advertised, use Inquiry Card, page 325

MACHINERY, September, 1955—375



Reversible Nutrunner

Chicago Pneumatic Tool Company, Dept. M1
8 East 44th Street, New York 17, N. Y.

- ☐ Please send me FREE booklet SP-3164 "Magnamatic Case Histories."
- ☐ Please send me "Magnamatic" Bulletin SP-3126.
- ☐ Have representative call.

NAME _____ TITLE _____

COMPANY _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

NEW!

Controlled-Torque
power
screwdriver-
nutrunner

the revolutionary CP "Magnamatic"

with the
one-shot clutch



An air-driven torque screwdriver-nutrunner that can be preset to run one screw or thousands* to specified torque ... that's the CP One-Shot "Magnamatic."

In design and operation "Magnamatic" is entirely new, but thoroughly proved in more than eighteen months of field testing and operation on production lines:

- an Alnico magnetic One-Shot clutch, adjustable to specified torques, disengages completely the instant the fastener is driven to the desired tightness. The clutch does not impact or ratchet—the irritating "buzz" of conventional tools is eliminated. Inexperienced or fatigued operators can't burr screw heads, strip threads, shear fasteners, or damage work surfaces. It is impossible to overdrive a nut or screw with a CP "Magnamatic" no matter how long the tool is held on the work.

A complete line of One-Shot "Magnamatic" Screwdrivers, reversible and nonreversible types, in capacities from #4 screws to 3/8" bolt size, is now in production.

*On the assembly line of a midwestern manufacturer, an operator is running 16,000 #6-32 screws per day with "Magnamatic" to a critical torque specification.



Reversible
Screwdriver



Screwdriver

ONE-SHOT "MAGNAMATIC" SCREWDRIVER-NUTRUNNER

- can be preset to drive fasteners to specified torques.
- maintains the selected torque setting indefinitely.
- has no clutch jaw wear.
- disengages the instant the fastener is run to desired tightness.
- eliminates the need for skilled operators.
- eliminates stripped threads, sheared fasteners, surface damages.
- prolongs service life of screw bits.



Chicago Pneumatic

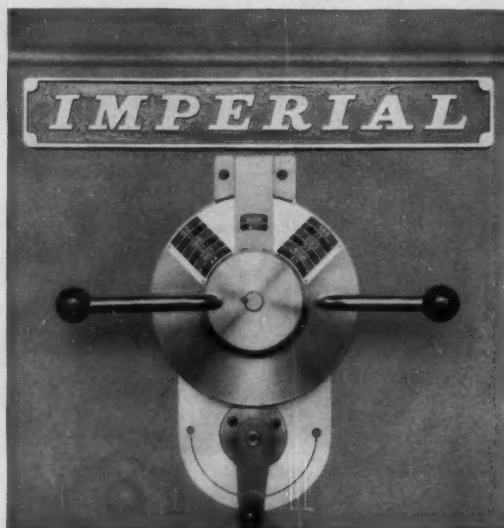
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NEBEL MACHINE TOOL CORP.



Direct reading
speed selector controls
18 or 36 spindle speeds

2 levers and color-keyed speed plates
control the entire range of 18 spindle
speeds: 11 to 666 rpm or 16 to 1000
rpm with single speed motor — or 36
spindle speeds with 2-speed motor:
5 to 666 rpm or 8 to 1000 rpm.



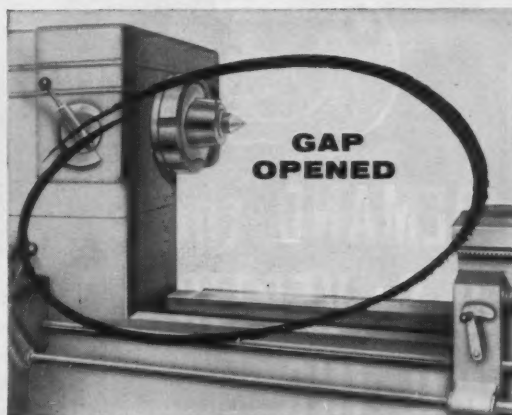
Compare the IMPERIAL . . . and you'll buy the IMPERIAL

| | Imperial | Lathe Z |
|----------------------------|----------------------------|---------|
| Swing over ways | 24 1/2" | 20 1/2" |
| Swing over gap | 42" | 41 1/4" |
| Spindle speeds, number | 18 (36 with 2-speed motor) | 24 |
| Spindle speeds, range, rpm | 11-666 | 11-673 |
| Main drive, motor, hp | 10-20 | 10 |
| Weight, net, lbs. | 8500 | 8200 |

IMPERIAL EXTENSION BED GAP LATHE DOES DOUBLE DUTY



With the gap closed, the new Imperial will accommodate all your standard engine lathe turning up to 24½" in diameter.



Moving the sliding upper bed to the right opens up a wide, deep gap that will swing outsize work up to 42" in diameter.



NEW NEBEL IMPERIAL COSTS LESS

than competitive lathes

yet offers comparable capacity, speed, power and weight!

"Absolutely the biggest bargain ever offered in a new metal-working lathe." That's the best way to describe the all new Nebel 20"/40" Imperial extension bed gap lathe.

For this versatile new lathe will turn all your engine lathe work up to 24½" diameter — and in the wide, deep gap, it will swing all your odd-shaped, outsize jobs up to 42" in diameter.

The new Imperial has 18 spindle speeds ranging from 11 to 666 rpm (or 16 to 1000 rpm) — and with a 2-speed motor, you can have 36 spindle speeds

ranging from 5 to 666 rpm (or 8 to 1000 rpm). It has automatic lubrication, 3-bearing spindle, Timken anti-friction bearings throughout headstock. It's arranged for a 10- or 20-hp main drive motor . . . and it's Nebel designed, engineered and built for long life accuracy, years of trouble-free service. When you buy an Imperial, you're in for a new experience in operating ease, efficiency and economy. Nebel Machine Tool Corp., Cincinnati 25, Ohio, U.S.A.



SEE THE NEW IMPERIAL AT THE SHOW!

Be sure to see the new Imperial — and other Nebel gap and engine lathes — in action in Nebel booth 511 at the Machine Tool Show, International Amphitheatre, Chicago, September 6-17.



Nebel
LATHES
CINCINNATI



WHEN PROFIT TOLERANCES ARE CLOSE

DEMAND the U.S. VERTICAL MILLING MACHINE



THE U. S. BURKE
MACHINE TOOL DIVISION
17 Brotherton Road
Cincinnati 27, Ohio

... for fast, accurate production

The U. S. Vertical Milling Machine is designed to speed work, assure precision milling. Its heavier knee and table, wider saddle and increased bearing surfaces provide the rigidity absolutely necessary for close work. Its accuracy is certified.*

New giant-sized micrometer dials are easy-to-read, simplify close tolerance milling. Three head feeds, one power and two hand, provide the needed versatility for any type cut.

Write for full specifications and detailed descriptive literature.

*Certified Accuracy—Check list showing results of actual tests accompanies each machine.

new features

- New giant-size Dials
- Massive knee saddle and table
- Increased weight and strength

POWER HEAD

- Feed infinitely variable from .002" to .008" per revolution.
- Feed rate may be varied while in operation
- Completely enclosed hard chrome plated quill
- Coarse and fine hand feeds as well as power feed
- Quill travel — 5½"

SPECIFICATIONS:

| | |
|-------------------|--|
| Table size | 10" x 36" or 10" x 42" |
| Longitudinal Feed | 24" or 30" |
| Cross Feed | 11" |
| Knee Travel | 16½" |
| Dovetail Depth | 1¼" x 1½" |
| Vertical Screw | 1⅜" dia. |
| Weight | approx. 1 ton |
| Table Power Feed | 0"—12" per min. (infinitely variable) |

SEE THE QUARTET at the Coliseum Show, Booth 616.

It is an entirely NEW Milling Machine . . . that does horizontal, vertical, angular and universal milling.

THE **U * S * Burke** MACHINE TOOL DIVISION

*New!
Revolutionary!*

Colonial ONE-WAY Surface Broacher



*"Eliminates" Return-Stroke
"Eliminates" End of Stroke
"Doubles" Length of Stroke*

For complete information on the new Colonial ONE-WAY surface broacher, ask for Bulletin VC-55. See it in operation at the Machine Tool Show.

**MECHANICAL DRIVE
AC MOTOR**

VARIABLE SPEED

**HYDRAULIC OR
MECHANICAL FIXTURES**

**CARBIDE OR
HSS BROACHES**

**NO PIT REQUIRED
FOR LOW CEILING**

LONGER TOOL LIFE

**EXTREME ACCURACY
GUARANTEED**

**STROKE LENGTH
UP TO 200 INCHES**

SPEEDS UP TO 50 FEET/MIN.

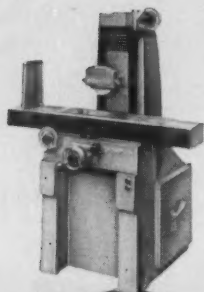
**ONE LONG STROKE—
ONE PART
OR**

**MULTIPLE SHORT STROKES
ON MULTIPLE PARTS**

CONTINUOUS OPERATION



UNIFIED BROACHING is the key to successful broaching

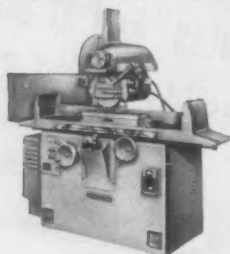


**TYPE D
HAND FEED SURFACE GRINDER**

Completely anti-friction design and permanently lubricated. Available with interchangeable vertical and horizontal spindle attachments.

from the new hand feed baby

**TYPE 2F
HYDRAULIC SURFACE GRINDER**



Tool room and production grinder with new coolant application both through the wheel and externally.

Thompson



PRECISION PETE SAYS:

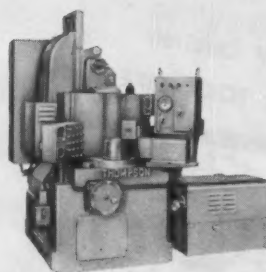
"Everybody knows Thompson Grinders are the very highest quality ... but in addition you'll find that they cost no more than many other grinders ... Buy Thompson for quality and price!"



**BOOTH NUMBER
1407**

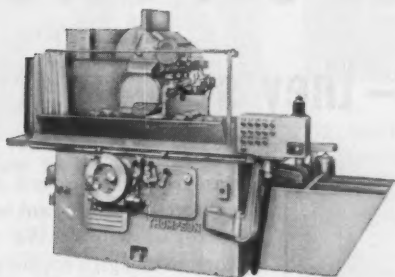
6" TWIN ROTARY GRINDER ...

with automatic control and automatic gauging.



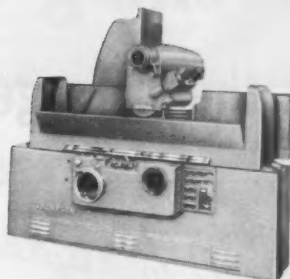
MODEL B TRUFORM GRINDER...

the latest 12" x 20" contour grinding machine with automatic crushing and truing cycle.



TYPE G
HYDRAULIC SURFACE GRINDER...

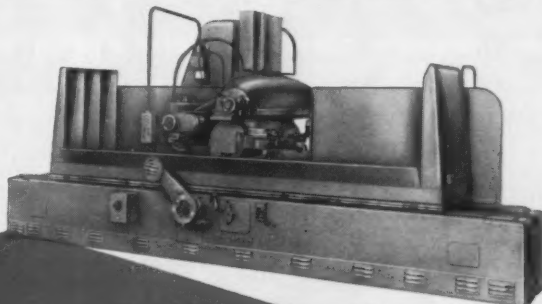
a deluxe surface grinder in 12" x 16" x 36" size range.



... invites you to see the newest developments in Surface Grinders.

TYPE CX
DOUBLE HEAD WAY GRINDER

way grinder, 36" x 36" x 120", with both horizontal and vertical heads.



... to the two headed giant

Call, write or wire today

**Thompson
Grinders**

THE THOMPSON GRINDER COMPANY • SPRINGFIELD, OHIO

For more information on products advertised, use Inquiry Card, page 325

MACHINERY, September, 1955—383

New High-Torque Unbrako self-locking socket set screws

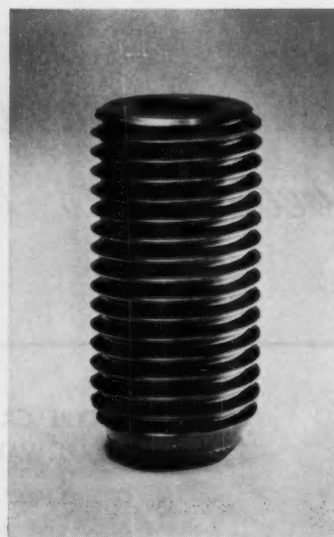
set them, forget them—they stay tight

*Up to 40% higher
tightening torque—
a new Unbrako feature*

| RECOMMENDED SOCKET SET SCREW TIGHTENING TORQUES (Inch-Pounds) | | | | |
|---|---------|------|------|------------------------------|
| SCREW SIZE | UNBRAKO | B | C | MINIMUM DIFFERENTIAL % |
| #4 | 5 | 3.9 | 3.5 | 28 |
| #5 | 9 | 7.8 | 7.4 | 15 |
| #6 | 9 | 7.8 | 7.4 | 15 |
| #8 | 20 | 14.7 | 14.5 | 36 |
| #10 | 33 | 26.5 | 25 | 25 |
| 1/4 | 87 | 62 | 60 | 40 |
| 5/16 | 165 | 122 | 125 | 32 |
| 3/8 | 290 | 198 | 225 | 29 |
| 7/16 | 430 | 309 | 350 | 23 |
| 1/2 | 620 | 460 | 500 | 24 |
| 5/8 | 1225 | 1106 | 1060 | 11 |
| 3/4 | 2125 | 1540 | 1800 | 18 |
| 7/8 | 5000 | 3660 | 4600 | 9 |
| 1 | 7000 | 5025 | 6500 | 8 |

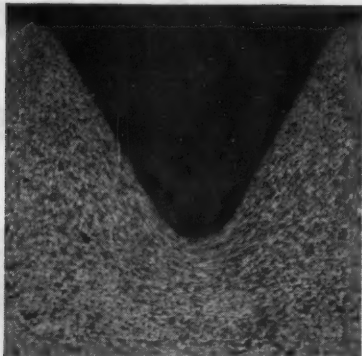
All UNBRAKOS can withstand higher tightening torques than ordinary set screws. For example, the recommended torque for a 1/4" UNBRAKO is 87 inch-pounds—40% greater than that recommended for an ordinary set screw.

Research has proved that the tighter you seat a set screw the better it works. We went to work to design a socket set screw that could be tightened tighter than ever before without damaging the screw.



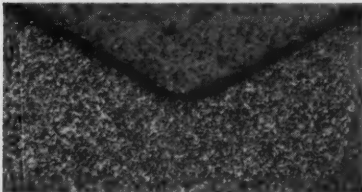
We formed a deeper socket. We put a radius in the socket corners. We developed fully formed threads. We established new methods of heat treatment in atmosphere-controlled furnaces. It took almost 6 years' research and development, but the new High-Torque UNBRAKO incorporates all of these improvements. And it retains the self-locking knurled cup point that keeps an UNBRAKO tight up to 48 times as long as a plain cup point set screw, regardless of the size of the point or the cup.

UNBRAKO SET SCREW



We fully form the threads—make the whole screw stronger. The metal is compressed into the closely knit grain structure that you see in this illustration. The grain flow follows the contour of the threads. There are no straight lines along which shear can occur. The UNBRAKO retains its flow lines even when ground down to .010" below root diameter. Screws with cut or ground threads lose thread form at root diameter.

UNBRAKO SET SCREW



We put a radius in the socket corners—eliminate the sharp corners where cracks start. This distributes the stresses developed when tightening torques are applied. Ordinary socket screws have sharp corners which often crack when tightened even at lower recommended torques.

UNBRAKO SET SCREW

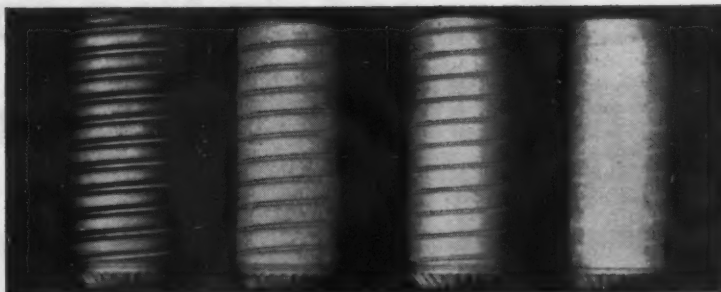


We form a deeper socket—give you more purchase with the wrench. Since more wrench can be put into the UNBRAKO socket, you can set the screw much tighter. And you won't ream the socket or round the corners of the wrench.

ORDINARY SET SCREW



UNBRAKO SET SCREW



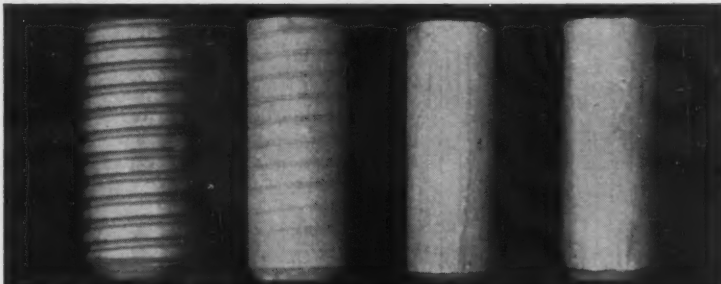
Pitch diameter

Root diameter

.005" below root diameter

.010" below root diameter

ORDINARY SET SCREW



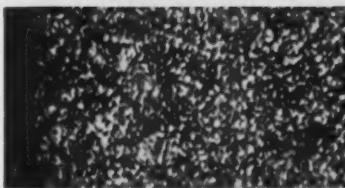
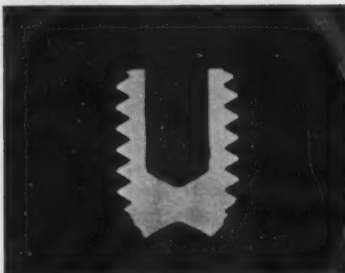
Pitch diameter

Root diameter

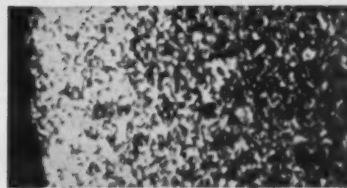
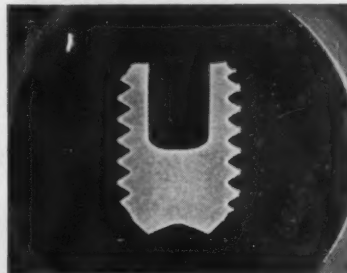
.005" below root diameter

.010" below root diameter

UNBRAKO SET SCREW



ORDINARY SET SCREW



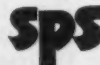
We heat treat an UNBRAKO properly. It's a ticklish job to heat treat a socket set screw. If you don't do it just right, you get decarburization. And decarb plays havoc with a screw. Put a wrench in the socket and you ream it. Run the screw into a tapped hole and you strip its threads. Try to seat the screw and its point shears off. These photos show the good and the bad. The UNBRAKO is clean. Its grain structure is uniform. There is no decarburization—the ordinary screw is suffering from an overdose of it, socket walls, threads and point are full of the telltale white spots.

You can't buy another set screw as good as an UNBRAKO. See your authorized industrial distributor today. Or write STANDARD PRESSED STEEL CO., JENKINTOWN 19, Pa.

Visit Booth 828 at the Production Engineering Show—see the new UNBRAKO High-Torque Socket Set Screw demonstrated

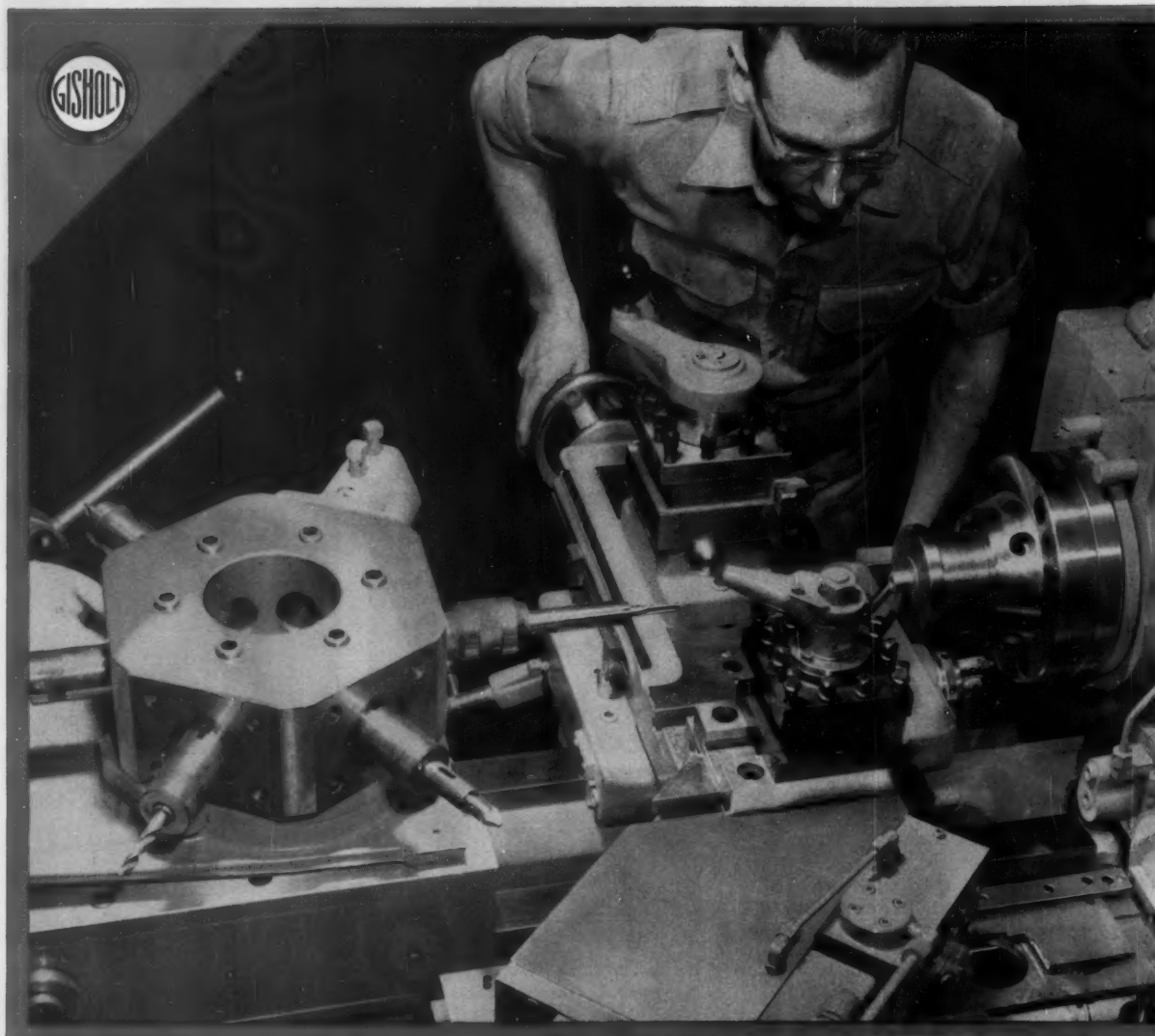


SOCKET SCREW DIVISION



JENKINTOWN, PENNSYLVANIA

Turret lathe output and with Scully-Jones



**SCULLY
JONES**

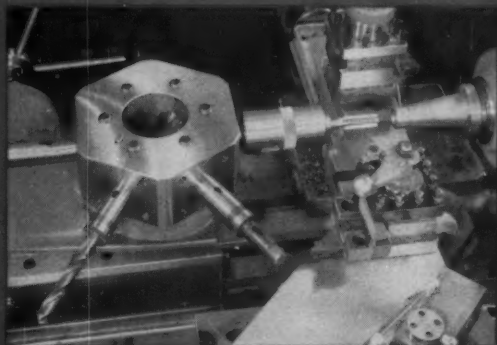
**"Precision Holding" solves diversified tooling
problems on Gisholt Turret Lathe**

This Gisholt No. 5 Ram Type Turret Lathe—a machine that's truly easy to operate—is equipped with hydraulic tracer and nine different Scully-Jones "Precision Holding" Tools in the hex turret (for two setups). It will be exhibited by Gisholt Machine Company in Chicago next September at the Machine Tool Show—Booth No. 1413.

See this exciting demonstration of accuracy and high production on a Gisholt Lathe performing 11 diversified operations on two ends of Scully-Jones Shell End Mill Arbors.

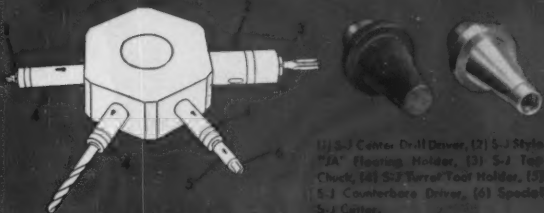
accuracy assured . . .

Holdings in the hex turret

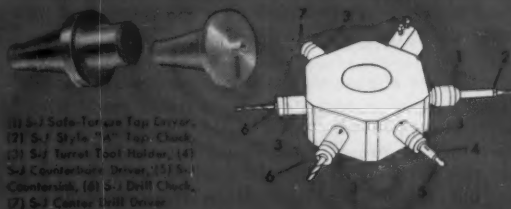


(Above) Scully-Jones JETRA-CUT controls turning and boring operations on 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000.

TOOLING FOR SHANK END



TOOLING FOR PILOT END



Take full advantage of turret lathe accuracy and productivity, reduce tooling costs, and make the job easier by putting Scully-Jones Holders in the hex turret.

Look at the *extra* gains on this job! Turret Tool Holders and Counterbore Drivers have the *new* "Keyhole" drift slots—an exclusive Scully-Jones feature—which make tool changes faster, easier, and safer. With the "Keyhole" ejection method, possible tool and machine damage is eliminated. Powerful pressure is exerted directly behind the tool simply by turning the camshaped ejector.

The Safe-Torque Tap Driver—another *new* Scully-Jones tool—increases tap life greatly (as high as 500% on some jobs), permits tapping at full speed to full depth, and helps produce more uniform, accurate threads.

And Scully-Jones Drill and Tap Chucks, with improved 4-slot design, provide increased resistance to pull-out, improved seating and collet action, more protection against tool breakage and production shutdowns.

Not only do Scully-Jones tools give you *more than's new* in holding and driving methods, but there's a sureness, a greater measure of accuracy, a new factor of dependability that puts a "Scully-Jones-equipped" turret lathe in a cost class all by itself.

So, when you buy or *retool* a machine tool, make sure it's equipped with Scully-Jones "Precision Holding" Tools. Call your Scully-Jones representative or distributor—factory-trained "Precision Tool and Work Holding Specialist"—for information and service.



SCULLY-JONES

"Precision Holding" for holding precision

Scully-Jones and Company, 1906 S. Rockwell Street, Chicago 8, Illinois

Safe-Torque
Tap Drivers

Drill and
Tap Chucks

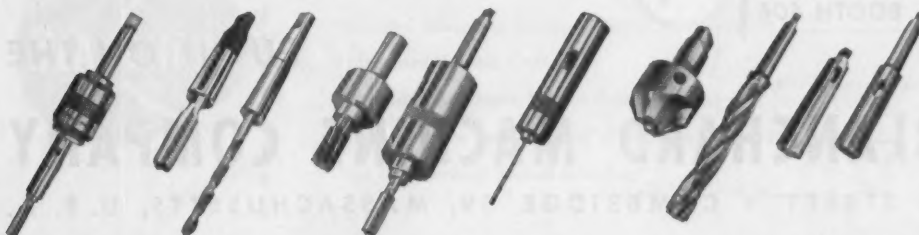
Floating
Holders

Turret
Tool Holders

Cutting Tools
and Holders

Sleeves
and Sockets

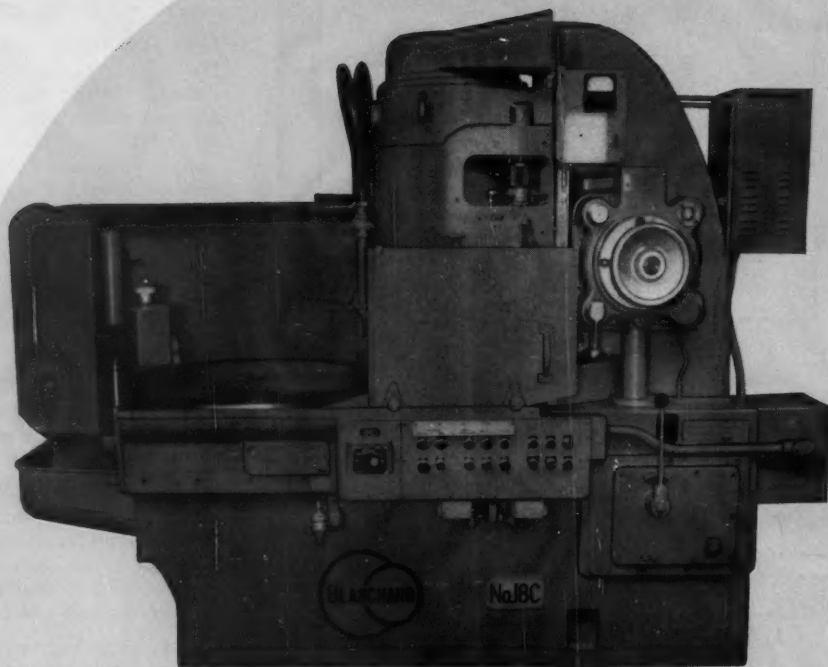
New "Keyhole"
Tool Ejection Method



For more information on products advertised, use Inquiry Card, page 325

MACHINERY, September, 1955—387

NEW BLANCHARD



NO. 18-C BLANCHARD SURFACE GRINDER

This great new Blanchard automatically does most of the operations ordinarily performed by an operator—including the important task of sizing. On suitable work, it holds a tolerance of $\pm .0005$ " in regular production.

The automatic cycle does almost all the work: moves chuck (30" or 36" dia.) to grinding position and starts it rotating; starts wheel rotation and coolant pump; provides rapid wheel approach to work; engages power down-feed at preset rate; changes to fine feed just before finished size is reached; stops feed when work is to size — "sparks" out; raises wheel head; stops wheel, coolant pump and chuck; moves chuck to loading position — demagnetizes chuck.

SEE THEM AT THE SHOW!



BOOTH 406

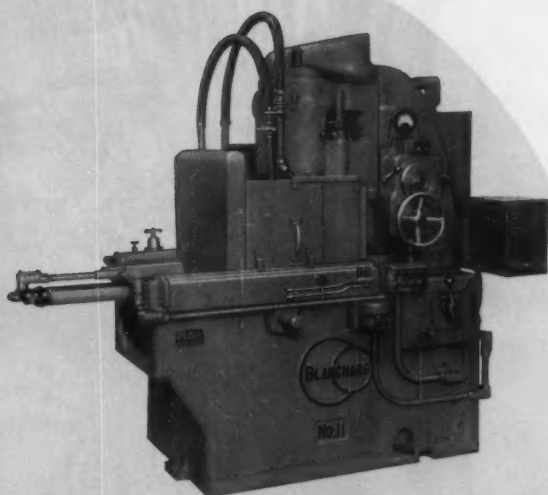
PUT IT ON THE

THE BLANCHARD MACHINE COMPANY

64 STATE STREET • CAMBRIDGE 39, MASSACHUSETTS, U. S. A.

SURFACE GRINDERS

for new production rates

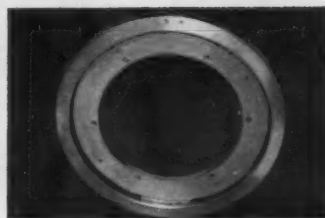


NO. 11 BLANCHARD SURFACE GRINDER

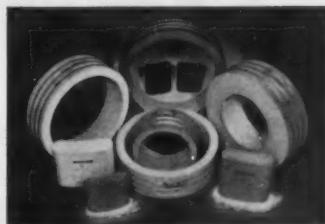
The smallest Blanchard Grinder is now available with power table traverse. Power table traverse speeds up the table movement from the loading to the grinding position—a valuable feature in high-speed production work, where both loading and grinding time is short.

The No. 11 Blanchard embodies the usual Blanchard features of one-piece steel magnetic chuck, 3-point adjustment of column and head, one-piece heavy base with 3-point support on floor, and direct motor drive.

Truly a precision machine, it also has the power and rigidity for rapid removal of metal.



BLANCHARD CYLINDER WHEEL HOLDER—saves time in changing wheels because it eliminates sulphuring wheels into rings. Optional standard equipment on all No. 11 and No. 18 Blanchard Grinders.



BLANCHARD WHEELS—assure your Blanchard Grinders of consistent high performance. Blanchard makes cylinder, sector and segment wheels in silicate, resinoid and vitrified bonds.



BLANCHARD DEMAGNETIZER—6" adjustable gap type for bench work only. It has sufficient power to demagnetize heavy pieces or a large quantity of small pieces. Also available: 15" adjustable gap.

NEW LITERATURE
MAIL COUPON FOR
FREE COPIES



THE BLANCHARD MACHINE COMPANY
64 STATE STREET, CAMBRIDGE 39, MASSACHUSETTS, U. S. A.

Gentlemen: Please send me the following folders:

- "No. 11 Blanchard Surface Grinder"
- "No. 18 Blanchard Surface Grinder"
- "No. 18-C Blanchard Surface Grinder"
- "Blanchard General Catalog"
- "Blanchard Automatic Surface Grinders"
- "Work Done On The Blanchard" (5th edition)
- "Art Of Blanchard Surface Grinding" (3rd edition)

NAME _____

TITLE _____

COMPANY _____

STREET _____

CITY _____ ZONE _____ STATE _____





**STANDARD OIL
COMPANY**
(Indiana)

Tool Room Superintendent Max Chase (left) and Production Engineer Peter Van Dyke (right) with Standard lubrication specialist R. T. Cleland inspect frame of extruded aluminum. Bob Cleland, a graduate of Michigan State with a B.S. in Mechanical Engineering and of Standard's Sales Engineering School, has the background to provide customers with competent technical service on their lubrication problems. This training and experience, customers have found, pay off for them.

STANOIL Industrial Oil does heavy chores for Light Metals Corporation

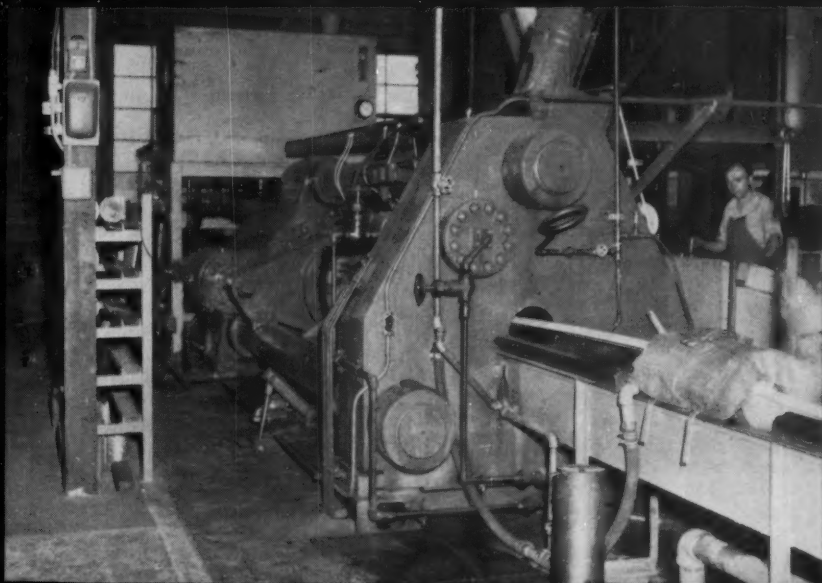
Three years ago Light Metals Corporation, Grand Rapids, put their 1,250 ton Hydopress into operation. The initial fill for the hydraulic system was STANOIL Industrial Oil. The press has operated continuously since its start up. There is no evidence of deposits or varnish anywhere in the hydraulic system. Light Metals Corporation looks forward to many more years of such trouble-free operation.

Why was STANOIL ordered by Light Metals for their Hydopress? The answer is found in the service STANOIL has given in other equipment. Back in 1948 when a Watson-Stillman extrusion press went into operation for Light Metals, STANOIL was chosen as the hydraulic oil. As with the Hydopress, STANOIL has a perfect per-

formance record. The Watson-Stillman press has operated seven years without a shutdown because of hydraulic fluid failure.

This kind of service from a hydraulic oil means Light Metals Corporation can turn out extruded aluminum shapes for the aircraft, automotive and major appliance industries with high performance and low maintenance factors that mean bigger profits. Reason enough for relying on STANOIL.

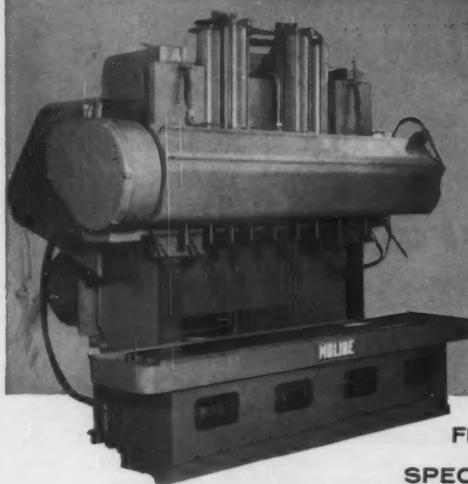
STANOIL Industrial Oil can perform for you just as it is doing for Light Metals Corporation. In the Midwest a lubrication specialist from your nearby Standard Oil office will explain how. Call him. Or contact, Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.



Light Metals Corporation uses this 1,250 ton Hydopress for extrusion of aluminum shapes for aircraft, automotive and major appliance industries. Press operates at 2,840 psi in the hydraulic system. Hydraulic medium is STANOIL.

AT THE

MACHINE TOOL SHOW

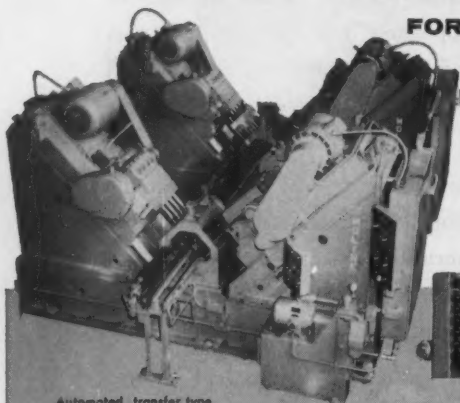


HD67 Multiple Spindle, Straight Line Type, Hydraulic Rail Feed Drilling Machine. Spindles are adjustable for center distance along machine rail. Maximum distance between the two end spindles is six feet. One of these HD67 machines will be at the show.

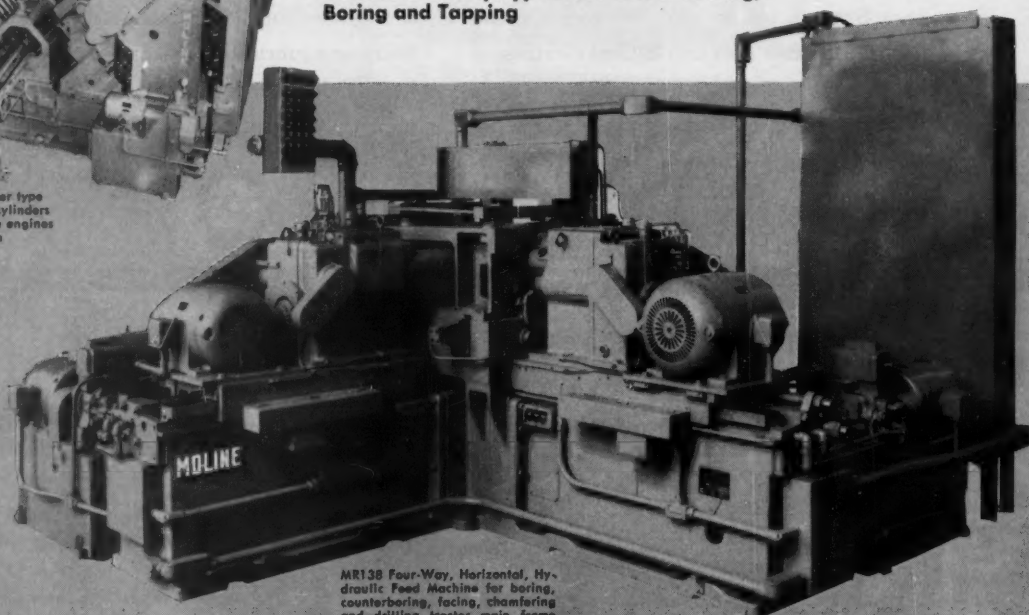
FIND OUT HOW **MOLINE "Hole-Hog"**
SPECIALLY DESIGNED **MACHINE TOOLS**
CAN INCREASE *Production, Efficiency, Savings—*

FOR SUCH JOBS AS:

- ★ Multi-Spindle Boring
- ★ Single and Multi-Spindle Honing
- ★ Straight Line Multi-Drilling
- ★ Adjustable Spindle Drilling
- ★ Vertical and Way-Type Fixed Center Drilling, Boring and Tapping



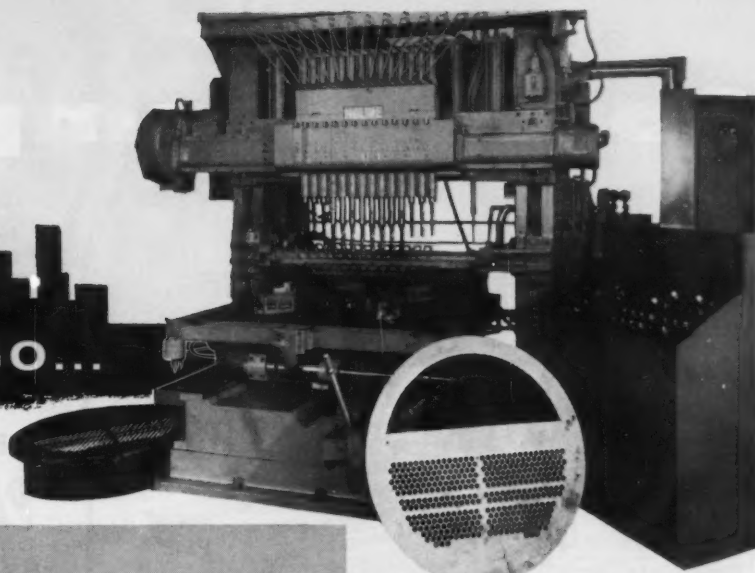
Automated, transfer type equipment bores cylinders of V-8 automobile engines and chamfers both ends of bores.



MR138 Four-Way, Horizontal, Hydraulic Feed Machine for boring, counterboring, facing, chamfering and drilling tractor main frame housings.

SEE US IN BOOTH NO. 1304

...IN CHICAGO...



HD68 Multiple Spindle, Hydraulic Rail Feed, Straight Line Type Drilling Machine, with cross-indexing table for drilling, reaming and chamfering holes in various sizes of tube sheets or header plates. A spindle unit like one of the fourteen shown here will be on exhibit in our booth at the show.

Take advantage of this opportunity to get information about special, Multiple Operation Machines which, like those illustrated here, are backed by our Machine Tool Engineering experience accumulated since 1901. Tell our representatives, in attendance at this show, your particular production problems. You will find them ready and able to provide you with interesting and practical suggestions.

"Hole-Hog"

is one of the finest lines of precision engineered Machine Tools, and users appreciate the built-in long life with trouble-free operation.

HU48 Universal Joint Type, Adjustable Spindle Drilling Machine with fourteen-foot by one-foot drilling area. Equipment includes thirty-six spindles, each with capacity for one inch diameter drill for drilling blade mounting holes in bulldozer weldments.



Representatives in all principal cities

MOLINE TOOL CO.

100 20TH STREET • MOLINE ILLINOIS

THE
MACHINE TOOL
SHOW
CHICAGO, ILL.
SEPT. 6-17, 1955
(INTERNATIONAL AMPHITHEATRE)



Come • Compare and See CLAUSING at



**CLAUSING 6300
SERIES LATHE**



FULLY ENCLOSED HEADSTOCK
Spindle turns on widely-spaced "Zero-Precision" Timken tapered roller bearings with tolerance of .00015".



ENCLOSED OUTBOARD DRIVE
With dual-belt outboard drive, replacing belts is a quick, easy job — no need to disassemble headstock and spindle. Variable speed drive optional.



DOUBLE-WALLED APRON
Thick-walled apron is fully enclosed. Has built-in safety lock, oil bath lubrication.

CLAUSING 6300 CONDENSED SPECIFICATIONS

CAPACITY Swings: 12 $\frac{3}{4}$ " over bed; 12 $\frac{3}{4}$ " over saddle wings; 7 $\frac{1}{2}$ " over saddle, 21 $\frac{1}{2}$ " - 33 $\frac{1}{2}$ " - 47" between centers. Beds: 47" - 59" - 72 $\frac{1}{2}$ ".

BED: 7 $\frac{3}{4}$ " wide, 5 $\frac{1}{4}$ " deep. Two Vee, two flat ways and underside of bed are precision ground.

THREAD RANGE: 48 selections, 4 to 224 Standard, right or left.

SPINDLE SPEEDS: Countershaft Drive, 8 (50-1300 R.P.M.) Variable Speed Drive, Infinite (30-1400 R.P.M.)

POWER LONGITUDINAL FEEDS: From .00065" to .0367" (left or right) per revolution of spindle.

TAILSTOCK: 1 $\frac{3}{4}$ " diam. ram, 3" travel. Ram graduated 0 to 3" by 1/16ths. No. 3 Morse Taper, 1" set-over.

SEE FOR YOURSELF THE MANY PLUS VALUE FEATURES

AVAILABLE ONLY IN CLAUSING HEAVY DUTY MACHINE TOOLS

At Booth 515 in the Coliseum you will have an opportunity to see for yourself the important basic design superiorities, performance and safety features that have made CLAUSING lathes, power-feed drill presses, and vertical millers far and away the outstanding values at or near their price.

For example, the 6300 lathe spindle turns on "Zero-Precision" Timken tapered roller bearings and has L-00 tapered key-locked nose, hardened and ground . . . fully enclosed headstock, double walled apron and quick-change gear box, *all* with oil bath lubrication . . . heavy duty tailstock has No. 3 M.T. ram with tang socket.

For production, tool room, maintenance, experimental or research work such CLAUSING plus value features as these will improve precision production while cutting costs.

We suggest you come to the Coliseum Show and see the exacting tolerance limits which every CLAUSING must meet. *We invite your critical inspection!*

***Write* for FREE SHOW TICKETS**

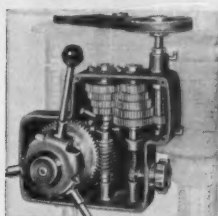
We will gladly send you a complimentary admission ticket to the Coliseum Show to save you all registration delays and entrance fees.



CLAUSING DIVISION

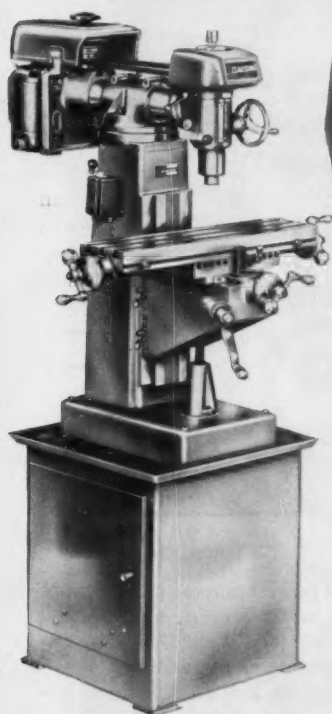
Draw your own **Conclusions!** the **Coliseum** show

CLAUSING 18" DRILL PRESS



CLAUSING POWER FEED

The heavy-duty gear driven power feed is positive and sure with no belt slippage to dissipate power. Feed selection is instant, by dial. Gears run in bath of oil.



The new Plus Value CLAUSING 18" Drill Press is setting new standards in tool and job capacity and performance. With Power Feed it is the outstanding value for heavy-duty production, tool room or general drilling operations. The 6½" spindle travel gives bigger job capacity, permits better use of production chucks. Drilling capacity: ¾" in steel, 1" in cast iron. Spindle nose is No. 3 M.T., handles larger tools. Exclusive vernier control provides .001" depth accuracy. Positioning mechanism saves set-up time — moves both head and table. Massive construction, precision-machining throughout, and the smoothness of 5 ball bearings insure exacting accuracy on every operation. Be sure to see this great drill press at the Coliseum Show.



CLAUSING VERTICAL MILLER

CLAUSINGS ARE EXTREMELY ACCURATE

Every CLAUSING MILLER must pass rigid tolerance tests — such as:

- 1 Top of table perpendicular to column ways, both directions, within .0005" in 8" travel.
- 2 Table top, front to back, square with column ways 0 to .001".
- 3 Table, parallel to turret within .001".
- 4 Spindle square with table, front to rear, within .001" T.I.T. in 5" circle.
- 5 Spindle taper (internal) run out within .0002" at spindle nose.
- 6 Table T-slots parallel to table dovetail ways within .0005" in 8" longitudinal travel.

The new CLAUSING Vertical Milling Machine mills, drills, bores, reams and shapes . . . at all angles with one work setup. It offers more PLUS Value features than have ever before been available in a miller at or near its price. Actually, it is several machines combined in one.

Features include: precision spindle head with 7 ball bearings. Quill is hardened and ground . . . bearings for quill are honed. All feed screws have ground threads, turn on ball bearings. Table surfaces and dovetail ways on table, saddle, knee and column are precision ground. The CLAUSING reduces setup and operating costs. It's low in initial investment, low in upkeep costs. See it at the show!

**SEE YOU AT THE
COLISEUM
MACHINERY SHOW**
CHICAGO

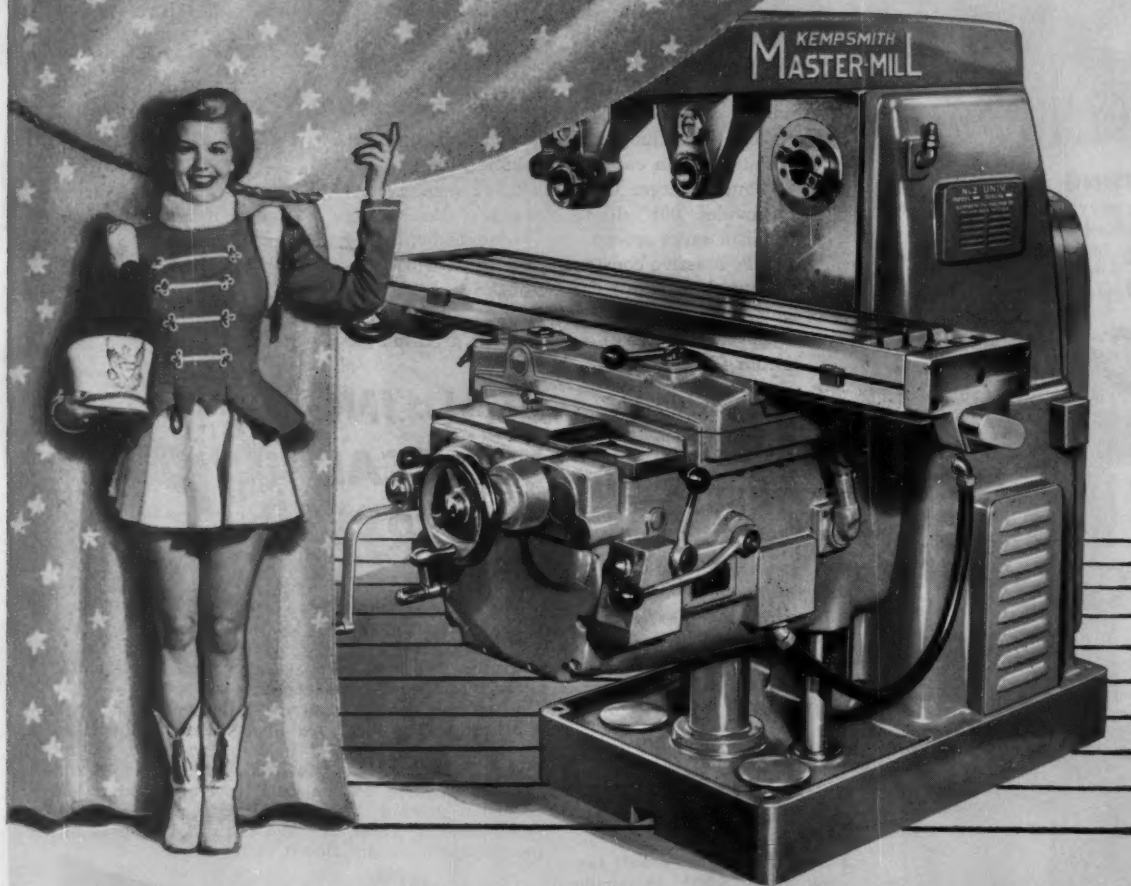
BOOTH 515

Sept. 6 - 17

Atlas Press Company

9-108 N. PITCHER ST., KALAMAZOO, MICHIGAN

Announcing the NEW **M KEMPSMITH MASTER-MILL**



See these New
MASTER-MILLS
Demonstrated at
the National
Machine Tool Show
Booth 616

MASTER-MILLS — modern machines for production and general purpose milling — cut milling costs to rock bottom by fully utilizing modern cutting tools and techniques. Conveniently located controls permit more rapid set-ups, thereby providing more cutting time. Low initial cost, plus economy of operation, assure highest return on investment. Now available in sizes No. 2 and No. 3 — Plain and Universal models. For literature, write:
KEMPSMITH MACHINE CO., 1821 So. 71st St., Milwaukee 14, Wis., U.S.A.

Precision-Built MILLING MACHINES Since 1888!

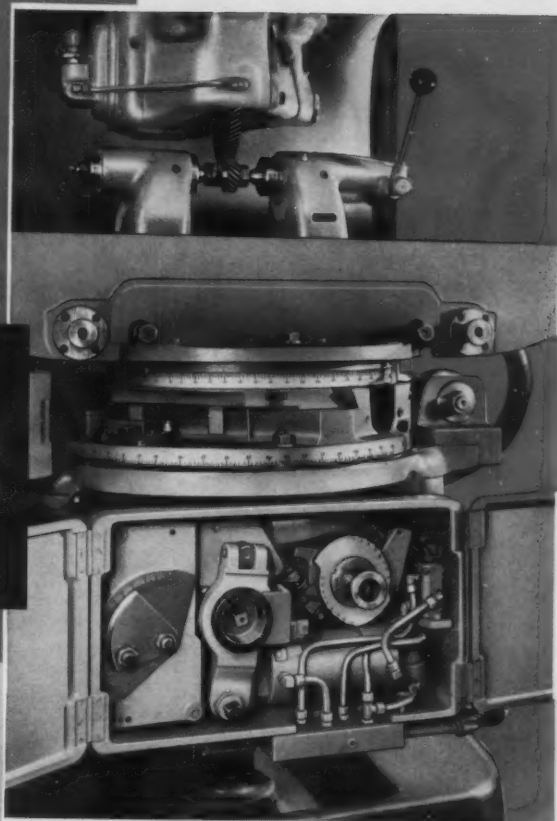
**SPEED Gear
Shaving and
Reduce Costs
with**

AUTOMATIC DIFFERENTIAL UP-FEED

Red Ring Automatic Differential Up-Feed, one of the great developments in the mechanics of gear shaving, offers you such important advantages as:

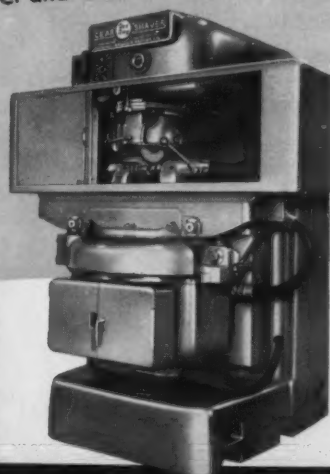
- Automatic multi-stroke shaving cycle of selected increments of feed and dwell.
- Saves 5 to 10 seconds on each work unit.
- Prolongs cutter life up to 200%.
- Eliminates operator's errors and resultant cutter breakage.
- Minimizes operator fatigue.
- Greatly reduces loading and unloading time.
- Comes from backlash into feed for first cutting stroke about three times faster than that of any other device known.

See us at the Machine Tool Show, Booth 1215.



- Every element of the cycle is positive, precise and fast.

The Automatic Differential Up-Feed is available on Red Ring Shaving Machine Models GCI and GCU.



SPUR AND HELICAL
GEAR SPECIALISTS
ORIGINATORS OF ROTARY SHAVING
AND ELLIPTOID TOOTH FORM

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Descriptive Data*

NATIONAL BROACH & MACHINE CO.

5600 ST. JEAN DETROIT 13, MICHIGAN

WORLD'S LARGEST PRODUCER OF GEAR SHAVING EQUIPMENT

For more information on products advertised, use Inquiry Card, page 323

MACHINERY, September, 1955—397



Gear stained by contaminated sulphurized cutting oil.

Spoon stained by sulphide in eggs.

Sulphur Staining on Ferrous Parts is Harmless

Staining of machined ferrous parts caused by cutting fluids containing active sulphur is similar to the stains you find on your silverware. It has no adverse effects whatsoever on the finish, or characteristics of the metal. *It is not corrosion*, and according to automotive and military authorities, in no way affects service life.

Experience has proved that cutting fluids containing active sulphur provide far better per-

formance when machining the tougher steels. Staining can only occur during very humid conditions or when water is allowed to contaminate the sulphurized cutting oil. A sample piece of metal will not stain in a cutting fluid free of water . . . but often it will the moment moisture is added.

The important factors to consider when selecting a cutting fluid are surface finish, production and tool life. Here is where

a cutting fluid pays for itself. Ask to have "the Man in the Barrel", your Stuart Representative, help select that Stuart Oil that will produce the very best results under the conditions you will subject it to.

Further information on sulphur staining is provided in the D. A. Stuart Shop Note Book, Bulletin S-1. Write for your copy.

D.A. STUART OIL COMPANY, LTD.
2739 S. Troy St., Chicago 23, Ill.

More than a "Coolant" Is Needed

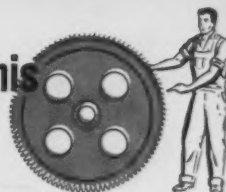
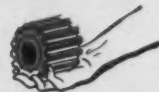
Plants in: Chicago, Detroit, Cleveland, Hartford, and Toronto, Ontario.
Branch Warehouses and Representatives in principal metal working centers in the United States, Canada and Europe.



Stuart Oils

Time Tested Cutting Fluids and Lubricants

How **C.P.C.** * replaced big gears like this
with little gears like this



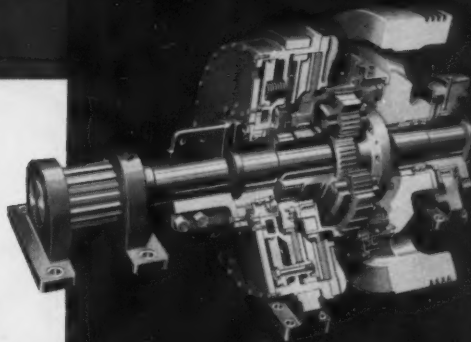
and got Out-of-this-World press performance with

planadrive



The Clearing Planadrive is a completely new type of underdrive press in which driveshaft speed is reduced so that it rotates at about one-third the R.P.M. of the flywheel. This new clutch is similar in principle to the Clearing Clearomatic clutch which is used to accelerate the cycling rate of mechanical presses. In the new Planadrive, *Clearing Productivity Consultants replaced the huge intermediate gearing ordinarily required in the press gear train with a set of planetary gears in the clutch itself.

As a result, the Planadrive clutch engages and disengages the drive-shaft at a relatively slow speed so that the kinetic energy of the members to be started and stopped is comparatively low. This results in a low-inertia, cool running clutch and brake. Actually, the kinetic energy in the Planadrive clutch is only 25% in starting (and 12% in stopping) by comparison to a conventional drive. For this reason, the press can be operated at a far higher number of strokes per minute than can be obtained from a conventional press of comparable capacity.



The key to the out-of-this-world performance of the Planadrive press is the clutch shown in cutaway above. Planetary gearing in the clutch reduces driveshaft R.P.M. to approximately 1/3 of flywheel R.P.M.

Planadrive is another example of the kind of thinking Clearing engineers apply to a manufacturer's problem of producing more efficiently. If you're interested in Planadrive, or if you want the kind of thinking that developed Planadrive working for you, call on Clearing Machine Corporation.

CLEARING PRESSES

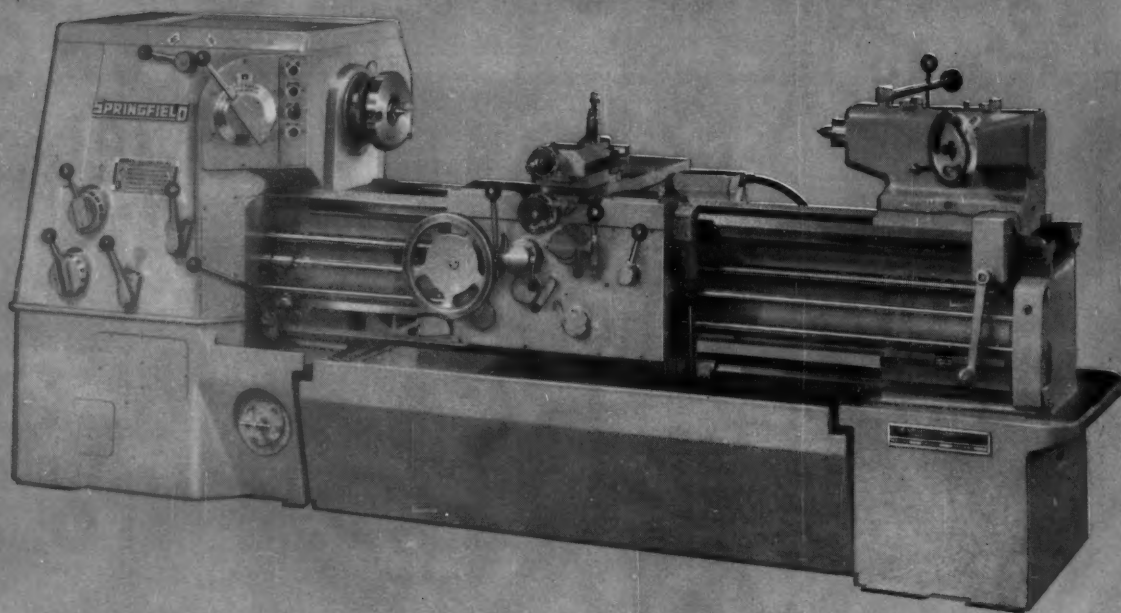
THE WAY TO EFFICIENT MASS PRODUCTION

CLEARING MACHINE CORPORATION DIVISION OF U. S. INDUSTRIES, INC.

8499 WEST 65TH STREET, CHICAGO 38, ILLINOIS • HAMILTON PLANT, HAMILTON, OHIO



See Springfield at Booth 612, Machine Tool Show, Chicago, Sept. 6-17.



more useful horsepower

All the horsepower in a Springfield Model "S" Lathe is productive.

A simple, straight-forward gear train, plus double-action lubrication, plus tight dynamic balance tolerances (.0005" displacement) eliminate friction and vibration, the twin horsepower thieves.

In the headstock, only the gears necessary to a given speed are engaged. Other gears run free with a stabilizing flywheel action, no drag on power.

A high pressure filtered oil mist keeps all gears and bearings drenched, and a cascade of oil lubricates the feed box.

Lathes: Engine and tool room, contouring and reproducing—swings 14" to 32".

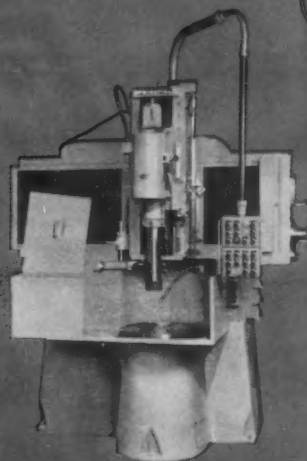
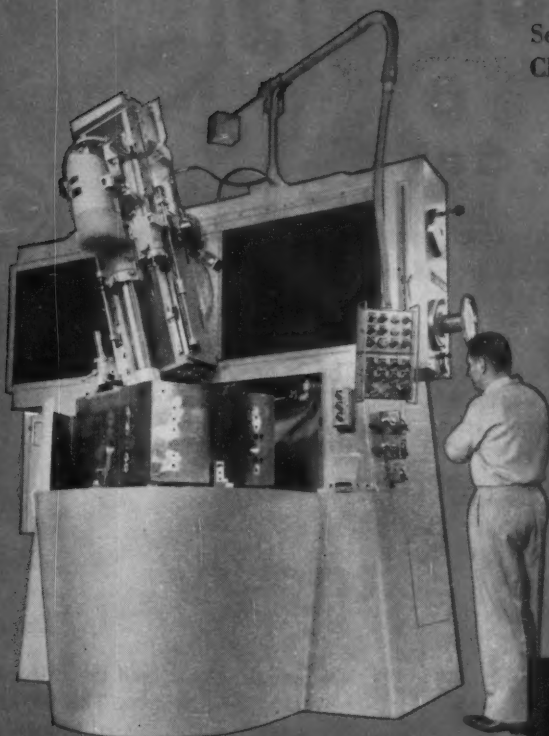
Vertical Universal Grinders: swings 18" to 42".

The Springfield Machine Tool Company
Springfield, Ohio

65TH YEAR OF BUILDING IDEAS INTO MACHINE TOOLS

SPRINGFIELD

See Springfield at Booth 612, Machine Tool Show,
Chicago, September 6-17.



one setup: nine jobs

As flexible, as responsive as a dentist's drill, a Springfield Vertical Universal Grinder can reach around and into a workpiece to do nine different jobs on one chucking.

If you make a pipeline valve, a mold, a bearing race—requiring micro-inch finish on any or all the faces shown in the diagram—at whatever angle—look into Springfield. These grinders cut down the number of set-ups, frequently eliminate hand-lapping, operate with fewer work-holding devices.

And, as a bonus, on jobs calling for extreme concentricity, one angle setting of the Springfield head grinds both faces of mating parts.

All three models readily adaptable to special problems.

Vertical Universal Grinders: swings 18", 24" and 42".

Lathes: Engine and tool room, contouring and reproducing—swings 14" to 32".

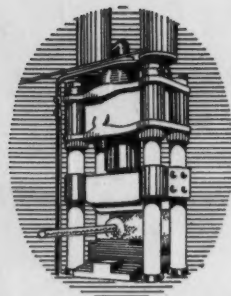
The Springfield Machine Tool Company
Springfield, Ohio

68TH YEAR OF BUILDING IDEAS INTO MACHINE TOOLS

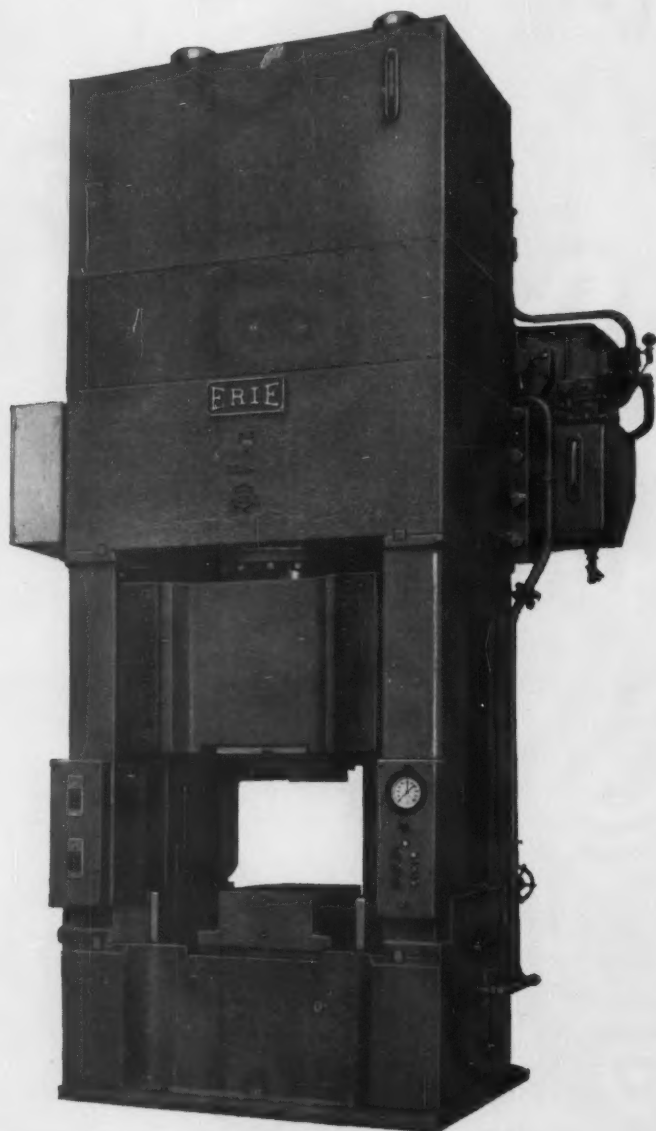
SPRINGFIELD

in the good old days

When press forging was done on steam hydraulic presses, water intensified . . . power strokes were short and slow.



Even then ERIE was the greatest name in forging machinery in both presses and hammers . . .



today

Erie Foundry has just built this extremely fast hydraulic forging press. This 1000-ton semi-automatic machine, used to forge jet engine turbine blades by a special process, completes a 6" stroke cycle in just 4 seconds.

Its high speed is achieved by using two self-contained pumps. This forging press incorporates speed control with automatic pressure and precision reversal by means of a special compression and decompression feature, designed by Erie hydraulic engineers. Maximum stroke is 28". A long (1 to 1) guide ratio insures accuracy. By combining side housing and strain rod construction, the machine is made rigid and produces perfect forgings.

Just one more indication of why Erie Foundry is today the greatest name in forging machinery.

in our 60th year



ERIE FOUNDRY CO. ERIE, PA.

Leading a Dog's Life..?

ARE YOU IN THE DOG HOUSE BECAUSE OF GRINDING WHEEL PROBLEMS? Then switch to CINCINNATI (PD) WHEELS. For now CINCINNATI Grinding Wheels offer POSITIVE DUPLICATION—a remarkable achievement in precision manufacturing and quality control that can *save you money . . . and increase your production.*

Here's how CINCINNATI (PD) WHEELS can put a twinkle in your eyes and a smile on your face: through the CINCINNATI (PD) Manufacturing Process you are assured Positive Duplication of the original wheel *every time you reorder.* "On grade" with a CINCINNATI (PD) WHEEL means all future (PD) WHEELS will act and grind exactly alike.

Yet CINCINNATI (PD) WHEELS are priced no higher than ordinary wheels.

So, let us help you get out of the dog house and lead a normal life again. Just contact us and we'll send one of our representatives—men who know grinding and grinding machines as well as grinding wheels. Write, wire or telephone Sales Manager, Cincinnati Milling Products Division, The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.

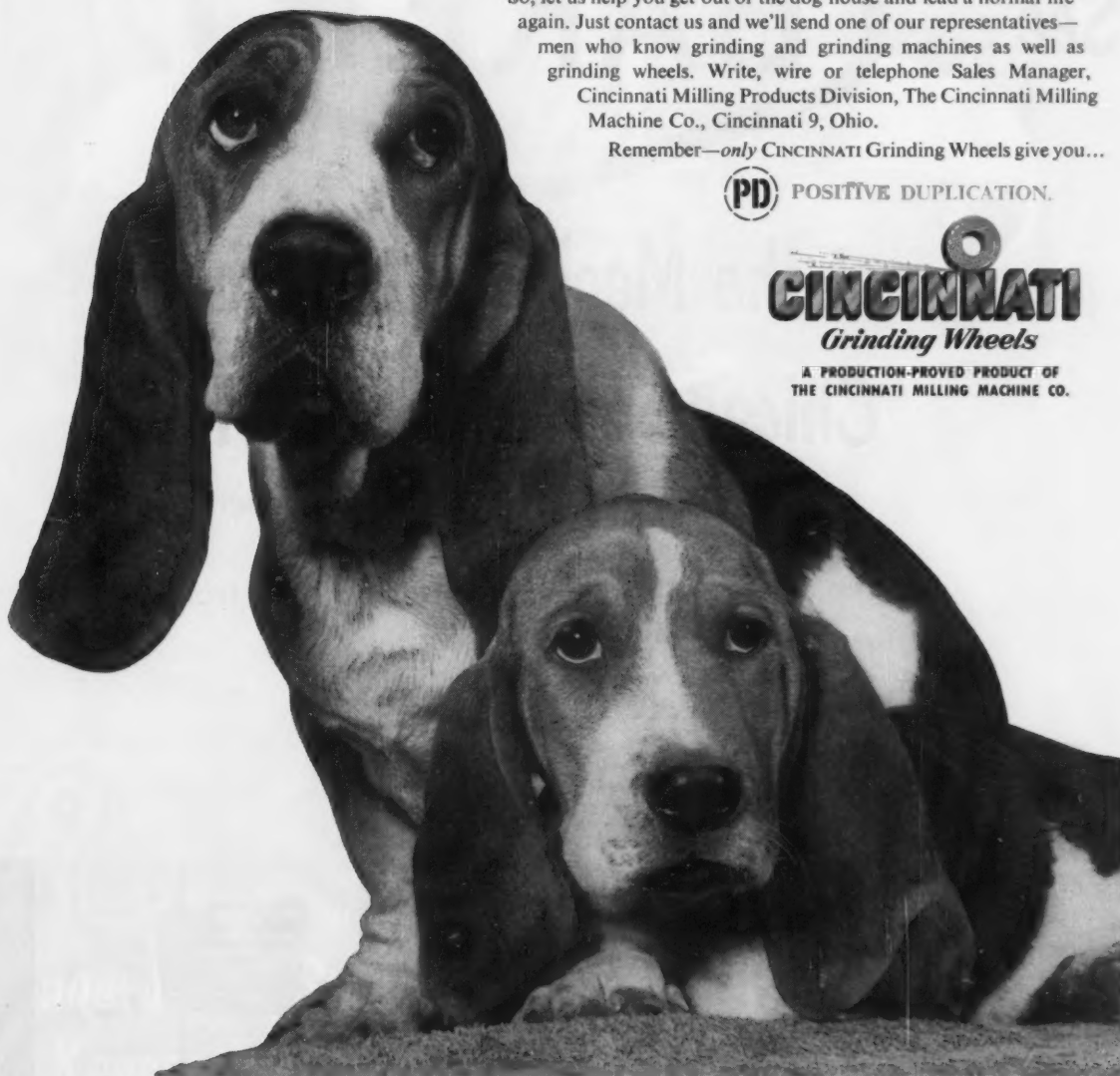
Remember—*only* CINCINNATI Grinding Wheels give you...



POSITIVE DUPLICATION.

**CINCINNATI**
Grinding Wheels

A PRODUCTION-PROVED PRODUCT OF
THE CINCINNATI MILLING MACHINE CO.



As the average man needs his car...



See...

BAKER

**at the Machine Tool Show
Chicago — Booth 1421**

Come in and see the low cost general
purpose special machines at work in a
practical demonstration of extreme
versatility at very low cost.

INCREASED PRODUCTIVITY THROUGH
BETTER MACHINE TOOLS

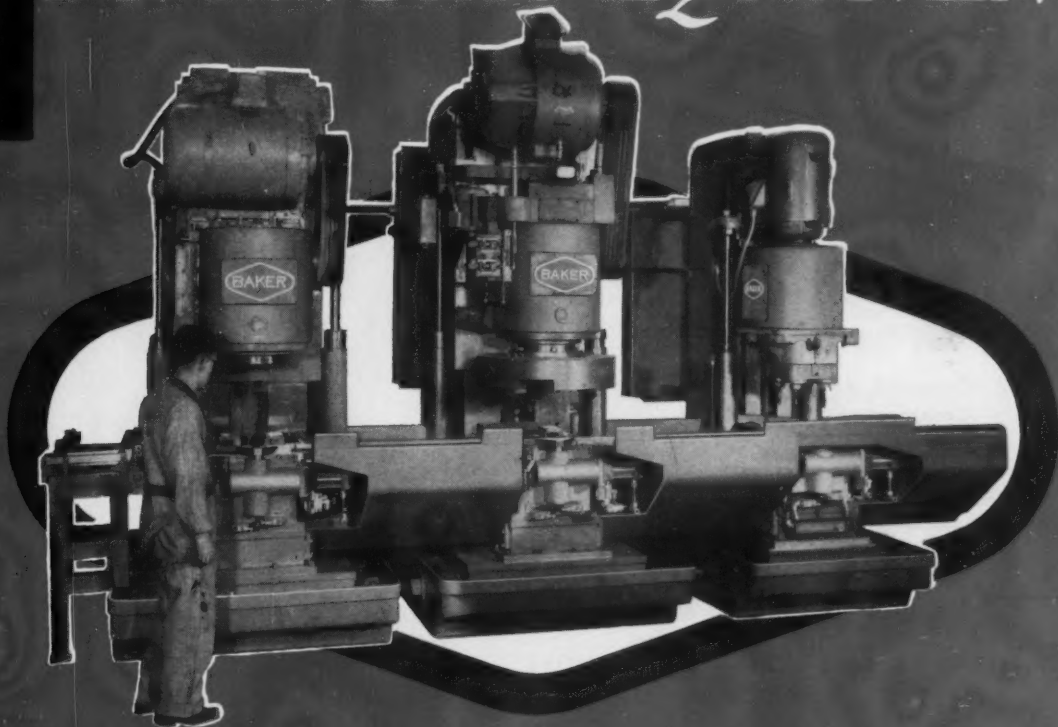
BAKER BROS., INC., Toledo, Ohio

SINCE 1875



BOOTH 1421

So the Average Shop Needs
and Now Can Afford
AUTOMATIC EQUIPMENT



The new Baker Transfer illustrated is to be introduced at the show. The Baker will be set up with a low cost, simplified fixture and combined to operate as a transfer machine, proving the possibility of providing automatic machines through use of STANDARD MACHINES. The machines Combination Bore and Counterbore . . . Face (cross feed) . . . and Multiple Drill . . . All Automatically.

FOR MORE THAN THREE-QUARTERS OF A CENTURY . . .

Standard and Special Drilling . . . Boring . . . Tapping
Keyseating and Contour Grinding Machines

FOR TOP EFFICIENCY . . . Logan Air and Hydraulic
Equipment On Your Product . . . In Your Plant

LOGANSQUARE CYLINDERS

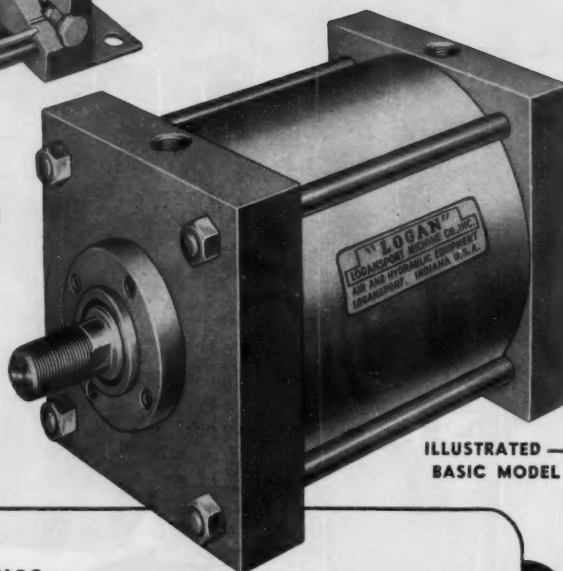
FOR AIR OR OIL



ILLUSTRATED —
CUTAWAY OF CYLINDER
WITH FOOT MOUNTING

NOTE—Compact, Rugged
Construction . . .

Designed for easy mounting



ILLUSTRATED —
BASIC MODEL

LOGANSQUARE CYLINDERS

STANDARD BORE SIZES:—

1½" to 8"

MAXIMUM STROKES:—

Up to 5 feet 150 psi Air
Up to 8 feet 80 psi Air
Up to 3 feet 500 psi Oil
(nonshock)
Up to 5 feet 250 psi Oil
(nonshock)

MOUNTINGS:—

Full range of mountings and mounting combinations to meet practically any requirement.
Tie Rod—Blind End, Rod End, Both Ends
Foot
Trunnion—Blind End, Rod End
Centerline
Flange—Blind End, Rod End
Pivot—Bolted Clevis, Welded Clevis
Rod—Single or Double End
Rod end has male threaded extension.
Other size male threads and female tapped ends available to customer's specifications.

Write for Logansquare Catalog 100-5

MEMBER—
National Tool Builders
Assn., National Fluid
Power Assn.



LOGAN MANUFACTURES 7023 STANDARD CATALOGED ITEMS

FREE CATALOG ON REQUEST

AIR CONTROL VALVES, Cat. 100-4 • AIR CHUCKS, Cat. 70-1 • AIR CYLINDERS, Cat. 100-1 • AIR-DRAULIC CYLINDERS, Cat. 100-3 • AIR and HYDRAULIC PRESSES, Cat. 51 • COLLET GRIP TUBE FITTINGS, Cat. 200-5
HYDRAULIC CONTROL VALVES, Cat. 200-4 • HYDRAULIC CYLINDERS, Cats. 200-2; 200-3 • HYDRAULIC POWER UNITS, Cat. 200-1 • SURE-FLOW COOLANT PUMPS, Cat. 62.

LOGANSPORT MACHINE CO., INC., 810 CENTER AVE., LOGANSPORT, IND.

EDLUND

NOW!

"F" SERIES

A Complete Line of Cost-Cutting

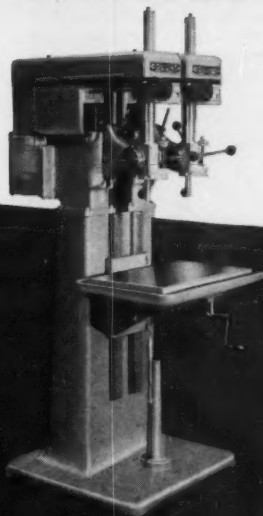
EDLUND Drilling and Tapping Machines

The Right Machine for You...

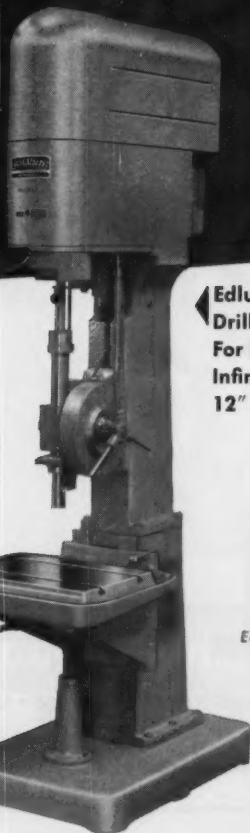
For Your Job...

For Your Product...

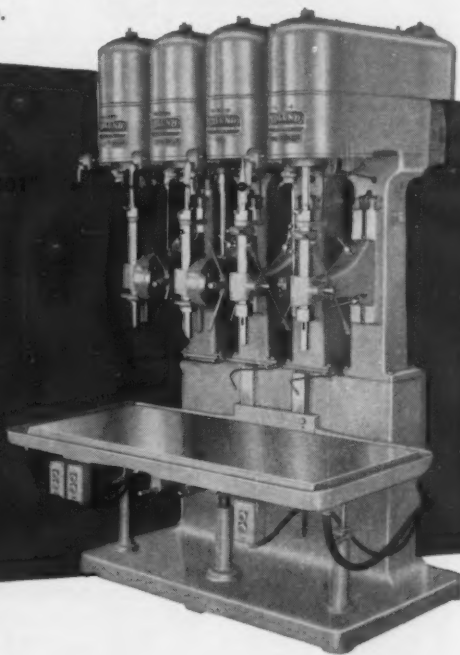
Whether you require light drilling operations of a sensitive nature, medium drilling and tapping, or heavy duty operations in all types of materials, there is an Edlund "F" Model for you.



Edlund Model 1F
 Drilling and Tapping Machine
 Extreme sensitivity
 Infinitely variable speeds to 10,000 RPM
 Motor-actuated Depth Gauge to .001"
 Automatic Spindle Tension Control
 7" Overhang, 1/4" Capacity



Edlund Model 3F
 Drilling and Tapping Machine
 For Medium to Heavy Drilling
 & Tapping Operations
 Infinitely variable speeds to
 2000 RPM
 11" or 13" or 15" Overhang,
 1/2" Capacity



Edlund Model 4F
 Drilling and Tapping Machine
 For Heavy Duty Drilling and Tapping Operations
 Infinitely Variable Speeds to 2200 RPM
 12" Overhang, 1 1/2" Capacity

Cost-cutting features make Edlund "F" Models the logical choice for plant expansion and for replacing obsolete equipment. Standard or Special Models from 1 to 8 spindles, with Power Feed, Reversing Motor Tapper, Lead Screw Tapper, and Back Gears are Available.

Let us supply you with case history folders, descriptive bulletins, complete specifications and quotations. Write us today at no obligation.

Edlund Representatives in Major Cities

See these machines in operation — Booth 115, NMTBA Show, Chicago.

EDLUND

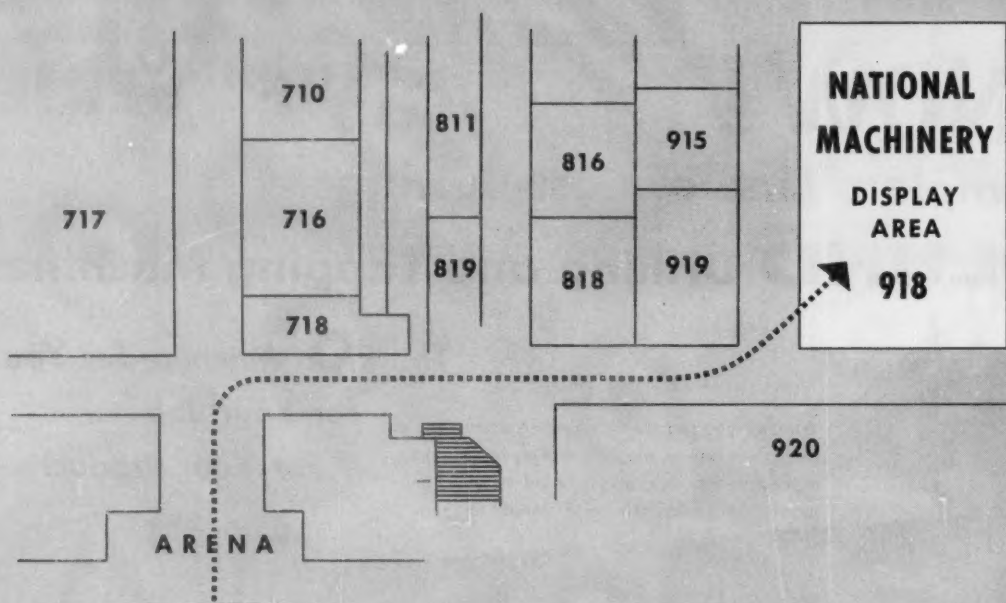
MACHINERY COMPANY

Cortland, New York

Division of Bradley Edlund Corp.

Affiliated with Precision Castings Co., Inc.





DISPLAY AREA 918 . . . PROGRESS IN FORGING

**AT THE MACHINE TOOL SHOW,
CHICAGO, SEPTEMBER 6 TO 17!**

We at National Machinery, WHQ*
for the development of advanced methods
and machinery for the forging industry,
for more economically producing
a wide variety of parts —
routine or unusual, ferrous or non-ferrous,
automatic or semi-automatic,
by cold forging or hot forging —
invite you to visit our working exhibit
at the coming machine tool show,
the first in seven years!

* WORLD



HEADQUARTERS

NATIONAL

MACHINERY COMPANY

TIFFIN, OHIO—SINCE 1874

DESIGNERS AND BUILDERS OF MODERN FORGING MACHINES • MAXIPRESSES • REDUCEROLLS • COLD HEADERS • BOLTMAKERS • NUT FORMERS • TAPPERS • NAILMAKERS

Hartford

Detroit

Chicago

At Booth 915 you will see Automatic Drilling and Tapping in "Operations Kingsbury"

You'll see the operator place a die casting in a work-holding fixture. You'll follow this casting as it cycles through 10 work stations, while 28 spindles perform 83 operations from five directions. And you'll see the finished part delivered to the operator a few seconds later.

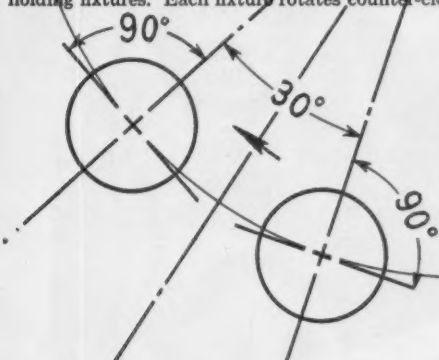
This Kingsbury machine is the twin brother of one which is now producing up to 880 parts per hour gross at a cost of not more than 8 3/4¢ per part. The job is unusual, even for a Kingsbury. Print called for work on 16 holes from four directions horizontally, and from the vertical. This is accomplished with seven Kingsbury units mounted on a 100-inch diameter base.

The Index Table is 26 inches diameter and has 12 work-holding fixtures. Each fixture rotates counter-clockwise 90°

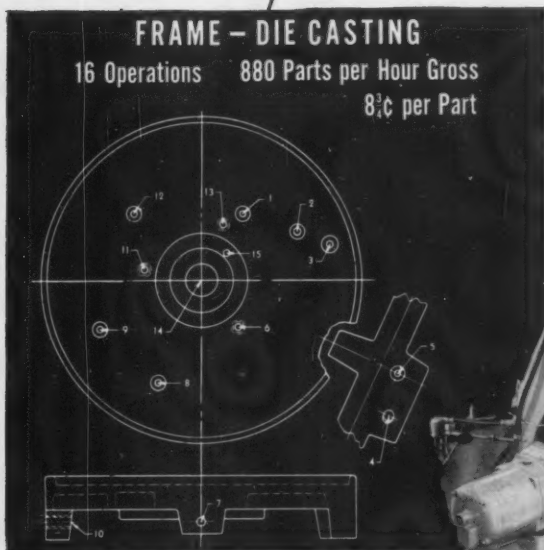
while the table indexes 30° clockwise. One operator loads and unloads the machine. Tool bushings guide the cutting tools. Electrical wiring and cabinet follow J.I.C. specifications.

Each Kingsbury is a special machine, designed and built at Keene, New Hampshire, by men who have accumulated a vast fund of experience in this highly specialized work. It co-ordinates multiple operations into a continuous production cycle — produces accurate, interchangeable parts rapidly and economically. Perhaps a Kingsbury can help you in your business.

Kingsbury Machine Tool Corp.
113 Laurel Street, Keene, N. H.

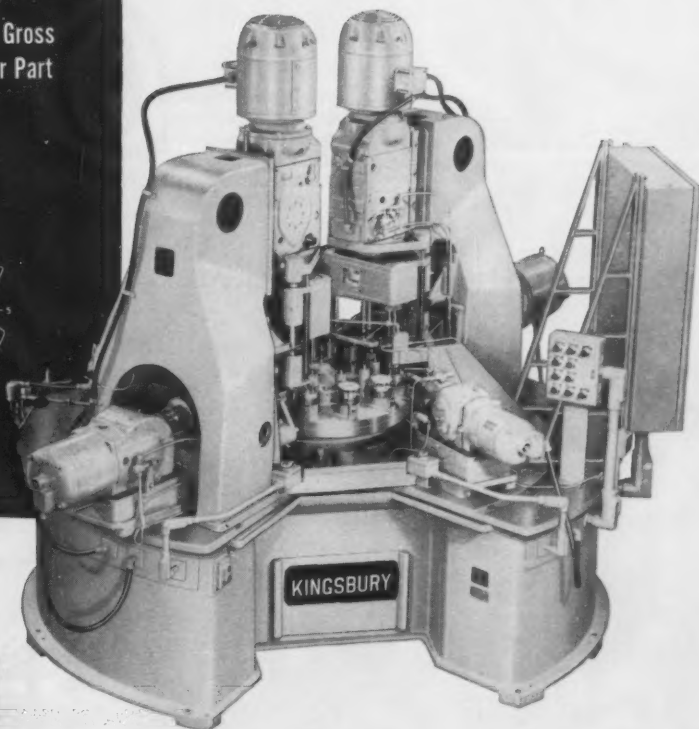


| WORK PERFORMED | | | | | HOLES NUMBERED | | | | | | | | | | | |
|--------------------------|--|---|---|---|----------------|----|---|---|---|---|----|----|----|----|----|----|
| BY SPINDLE | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| MACHINE STATION NUMBERS | | | | | | | | | | | | | | | | |
| Horizontal Units | | | | | | | | | | | | | | | | |
| Drill and Countersink | | | | | 1 | 4 | | 2 | | | 3 | | | | | |
| Tap | | | | | 7 | 10 | | 8 | | | 9 | | | | | |
| Vertical Units | | | | | | | | | | | | | | | | |
| Drill | | 2 | 1 | 3 | | | 2 | | 1 | 3 | | 1 | 2 | 3 | | 6 |
| Ream and Hollow-Mill | | | | | | | | | | | | | | | 5 | |
| Tap | | 8 | 7 | 9 | | | 8 | | 7 | 9 | | 7 | 8 | 9 | | |
| STATIONS WORKING ON HOLE | | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 |
| WORK PERFORMED PER HOLE | | 2 | 2 | 2 | 3 | 3 | 2 | 3 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 1 |

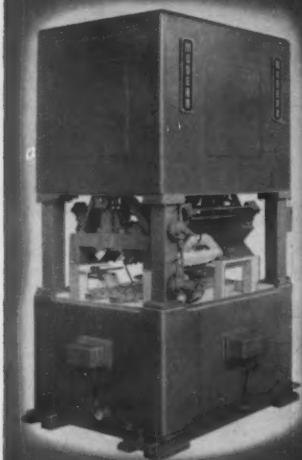


KINGSBURY

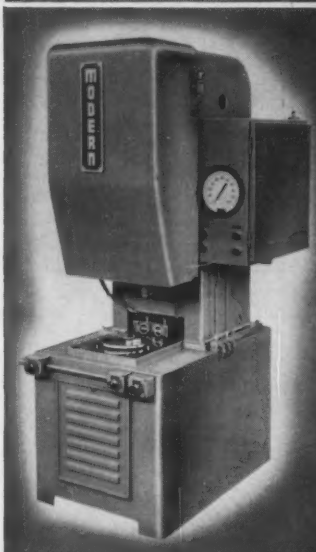
**AUTOMATIC DRILLING
AND TAPPING MACHINES**
for Low-Cost High Production



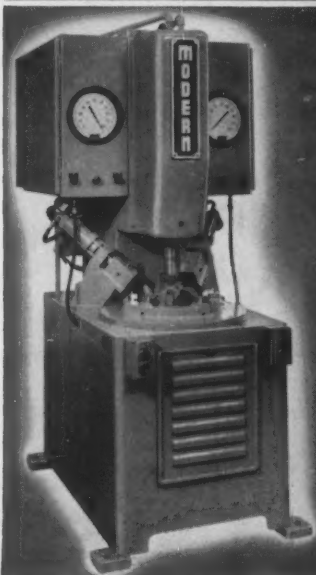
MACHINES YOU *Won't* ...but they're ready



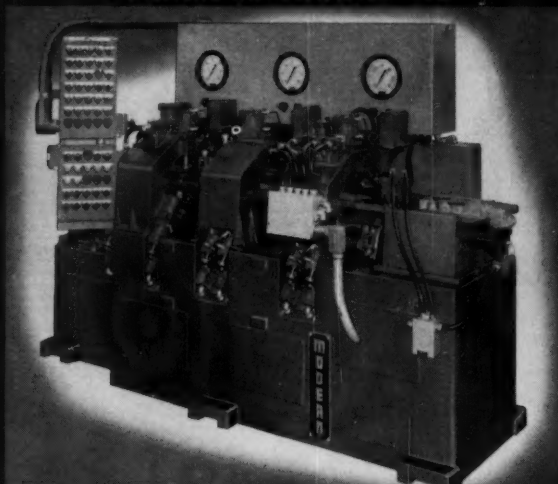
Leaks in defective cylinder blocks are precisely located by submersion under a pressure of 35 psi.



Transmission converter housings and end housings are tested in these two machines by putting air pressure into cavities, oil passages, etc.

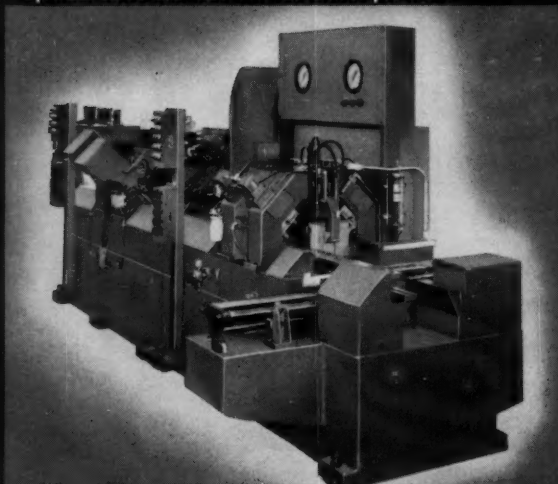


PRODUCTION PRESSURE TEST



Completely automated leak locator handles 133 manifolds per hour, checks three separate passages.

Coupled units automatically insert four dowels per cylinder block and leak test 100 blocks per hour.



MODERN

See AT THE SHOW to go to work for you!

Burr-Master GEAR DEBURRING AND CHAMFERING



Spur or helical gears and external spline from $\frac{3}{8}$ " to $9\frac{1}{2}$ " pitch diameter are accommodated by the eight single and two station models available. Complete chamfering and deburring job takes less than $\frac{1}{3}$ second per tooth.

AUTOMATION AVAILABLE
ON ALL MODELS
IF DESIRED



Internal gears and splines from $\frac{3}{8}$ " to $3\frac{1}{2}$ " pitch diameter are deburred and chamfered on the smaller model with the larger machine handling those from 2" to 20" pitch diameter. Production rate: 5 teeth per second.

Single and multiple station hypoid pinion Burr-Masters handle more than 200 pinions per hour per station.



Industrial Engineering Co.

14230 BIRWOOD AVE., DETROIT 38, MICH.

It's New!



A NO IMPACT HOLDDOWN SYSTEM FOR SHEARS

The Lodge & Shipley "No Impact" holddown system means *no mars, no dents, no holddown clatter* . . . and you still get positive holding power for accurate cutting, unsurpassed by any shear!

With the new Lodge & Shipley holddown system eliminating impact *and* damage, you can now shear the softest, most highly polished metals without impact mar. This "soft touch with terrific holding power" is a Lodge & Shipley exclusive!

Also available, for standard shearing, is the proven Hydro-Hold holddown system which offers positive, fast acting operation!

ASK ABOUT IT at The Machine Tool Show—Lodge & Shipley Booth 502. Also, be sure to see the All-New Shear and Press Brake.

In Shears, Too . . . Your Lodge-ical Choice

Lodge & Shipley

Hamilton Division
Hamilton 1, Ohio

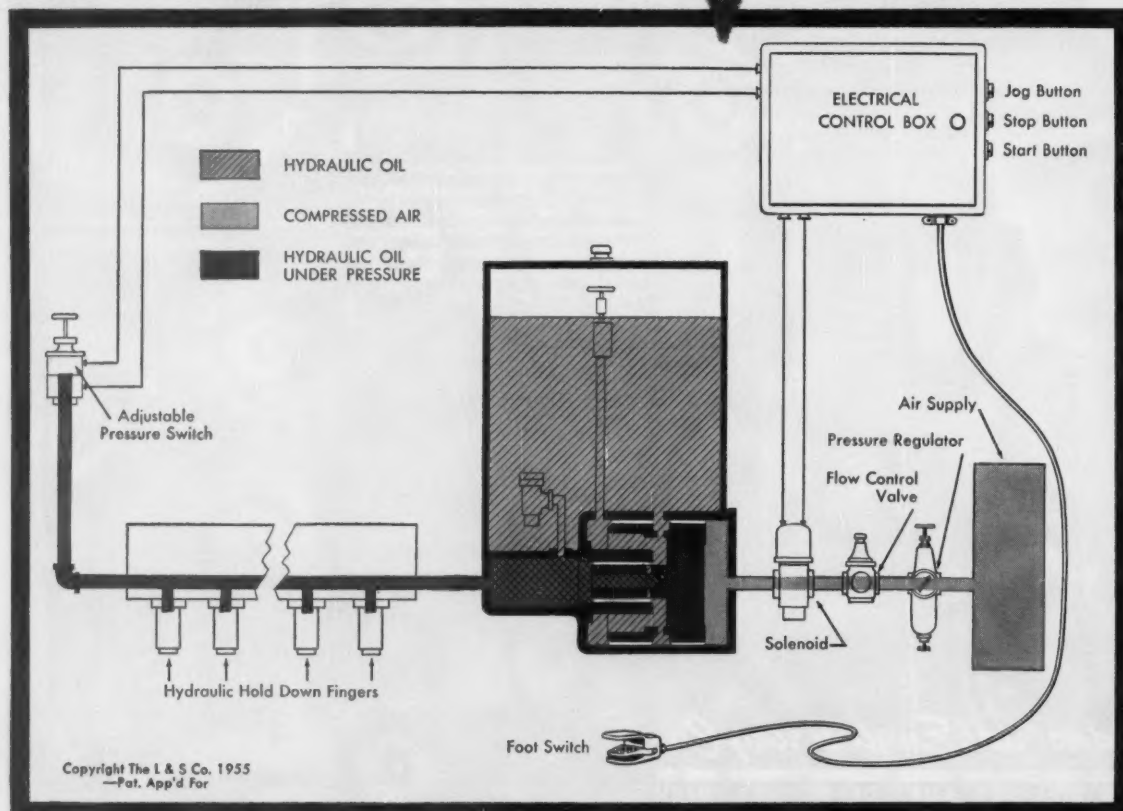
NOW . . . and exclusively from Lodge & Shipley . . . you can choose a shear with a holddown system perfectly suited to your shearing requirements.

"THE SOFT TOUCH WITH TERRIFIC HOLDING POWER"



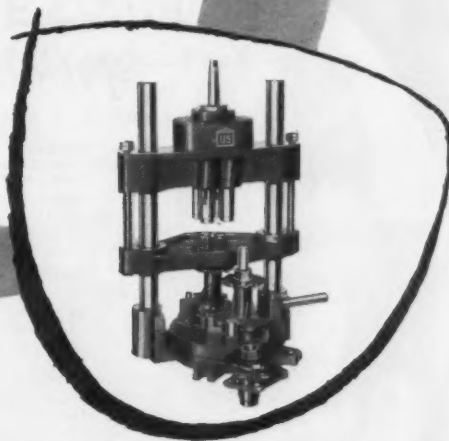
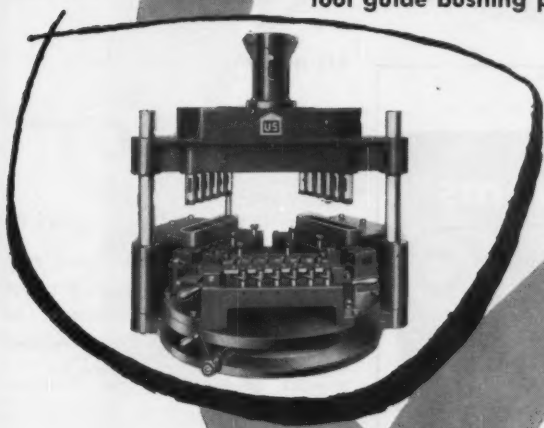
There's no impact, no damage, no noise, when the holddown lightly touches, then . . .

Tons of holding pressure are developed, before the blade starts to cut!



IT'S SAFER TO BUY DRILL HEADS, FIXTURES and BUSHING PLATES AS A COMPLETE PACKAGE

The 12-spindle unit shown below has a three-station hand-indexing table with three holding fixtures, complete with tool guide bushing plates.



Shown above is a drill head complete with boring bars with Carboloy-tipped cutters and Stellite wear strips. The indexing table has necessary holding fixtures with bushing guide plate.

The setup, left, has a two-position, hand-indexed fixture.

Write for details on any type of universal joint adjustable head. Ask also about our totally enclosed gear-driven adjustable, fixed center, or individual lead screw tapping heads.



UNITED STATES DRILL HEAD COMPANY

616-618 BURNS STREET • CINCINNATI 4, OHIO

Product Directory

To find headings easily, look for capital letters at top of each page to denote locations.

ABRASIVE CLOTH, Paper and Belt

Carborundum Co., Buffalo Ave., Niagara Falls, N. Y.
Walls Sales Corp., 333 Nassau Ave., Brooklyn 22, N. Y.

ABRASIVES

See Discs, Abrasive

ABRASIVES, HONING

Barnes Drill Co., 814 Chestnut St., Rockford, Ill.

ABRASIVES, Polishing, Tumbling, Etc.

Carborundum Co., Buffalo Ave., Niagara Falls, N. Y.
Macklin Co., 2925 Wildwood Ave., Jackson, Mich.
Norton Co., 1 New Bond St., Worcester 6, Mass.
Simonds Abrasive Co., Tacony and Fraley Sts., Bridesburg, Philadelphia, Pa.

ACCUMULATORS, Hydraulic

American Steel Foundries, Elmes Engineering

Div., Paddock Rd. and Tennessee Ave., Cincinnati, Ohio.
Baldwin-Lima-Hamilton Corp., Eddystone Div., Philadelphia 42, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Farrel-Birmingham Co., Inc., 25 Main St., Ansonia, Conn.
Hydro-Line Mfg. Co., 5764 Pike Rd., Rockford, Ill.
Hydropress, Inc., 350 Fifth Ave., New York 1, N. Y.
Lake Erie Engrg. Corp., Kenmore Sta., Buffalo, N. Y.
Vickers, Inc., 1402 Oakman Blvd., Detroit, Mich.

On metal-cutting problems

consult these

CIRCLE R
specialists



| | |
|---|---|
| BURBANK Production Machinery Sales, Inc. | MILWAUKEE Ford Tool Co. |
| CHICAGO Donald Robertson & Co. | NEW YORK CITY F. A. Brady, Inc. |
| CLEVELAND Production Tool Co. | NEW YORK CITY J. V. Cremonin (Export) |
| DAYTON J. R. Kuntz Company | PHILADELPHIA General Tool Sales Co. |
| DETROIT A. D. Spruce | PHOENIX DiEugenio Tool Center |
| INDIANAPOLIS Walter F. Greene & Associates | PITTSBURGH Ralph Esposito & Company |
| KANSAS CITY B. C. MacDonald & Co. | PROVIDENCE Fred J. McMillen |
| MONTREAL Humphrey B. Walton | ROCHESTER James O. Horne |
| | ST. LOUIS B. C. MacDonald & Co. |

For all production, including complex automation, we make the finest circular metal-cutting tools—but they cost no more.



CIRCULAR TOOL CO., INC.

PROVIDENCE 5, RHODE ISLAND

Specialists in

Circular Cutting Tools Since 1923

METAL SLITTING SAWS
COPPER SLITTING SAWS
SCREW SLITTING SAWS
COMMUTATOR SLITTING SAWS
JEWELERS SLITTING SAWS
CUT OFF SAWS • CIRCULAR
KNIVES • ROTARY SHEAR
BLADES • CIRCULOID STEEL
SAWS • SOLID & TIPPED
TUNGSTEN CARBIDE SAWS
COMBINED DRILLS & COUNT-
ERSINKS • CENTER REAMERS

AIR HOISTS—See Hoists, Air.

AIR TOOLS—See Grinders, Pneumatic; Drills, Portable Pneumatic, Etc.

ALLOY STEELS

Allegheny Ludlum Steel Corp., Pittsburgh, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Carpenter Steel Co., Reading, Pa.
Crucible Steel Co. of America, Oliver Bldg., Pittsburgh 30, Pa.
Firth Sterling Inc., 3113 Forbes St., Pittsburgh 30, Pa.
Ryerson, Joseph T., & Son, Inc., 2558 W. 16th St., Chicago 18, Ill.
U. S. Steel Corp., Carnegie-Illinois Steel Corp. Div., 436 7th Ave., Pittsburgh, Pa.
Vanadium Alloys Steel Co., Latrobe, Pa.
Wheelock, Lovejoy & Co., Inc., Cambridge, Mass.

ALLOY STEELS, High Temperature

Firth Sterling Inc., 3113 Forbes St., Pittsburgh

ALLOYS, Non-Ferrous

American Brass Co., 25 Broadway, New York
Haynes Stainless Div., Union Carbide & Carbon Corp., 30 E. 42nd St., New York, N. Y.
Mueller Brass Co., Port Huron 35, Mich.
Revere Copper & Brass Inc., 230 Park Ave., New York, N. Y.

ALLOYS, Zinc

New Jersey Zinc Co., 160 Front St., New York, N. Y.

ARBOR PRESSES

See Presses, Arbor

ARBORS AND MANDRELS

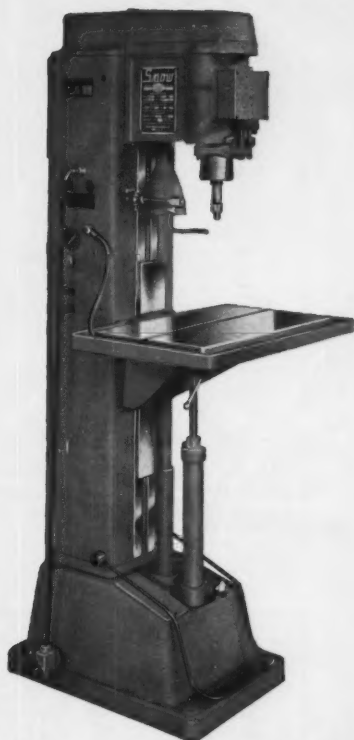
Axelson Mfg. Co., 6160 S. Boyle Ave., Los Angeles 58, Cal.
Brown & Sharpe Mfg. Co., Providence, R. I.
Chicago-Latrobe Twist Drill Works, 411 W. Ontario St., Chicago, Ill.
Cleveland Twist Drill Co., 1242 E. 49th St., Cleveland, Ohio.
Cincinnati Milling Machine Co., Oakley, Cincinnati, Ohio.
Danly Machine Specialties, Inc., 2107 S. 52nd Ave., Chicago 50, Ill.
Gorton, George Mch. Co., 1110 W. 13th St., Racine, Wis.
Jacobs Mfg. Co., West Hartford, Conn.
Kempsmith Machine Co., Milwaukee, Wis.
National Twist Drill & Tool Co., Rochester, Mich.
Pratt & Whitney, West Hartford 1, Conn.
Scully-Jones & Co., 1903 Rockwell St., Chicago 8, Ill.
Union Twist Drill Co., Athu, Mass.
Wesson Co., 1220 Woodward Heights Blvd., Ferndale, Mich.
Whitman & Barnes, 40600 Plymouth Rd., Plymouth, Mich.

(Continued on page 416)

SNOW

MANUFACTURING COMPANY

455 EASTERN AVENUE • BELLWOOD, ILLINOIS



FULL UNIVERSAL MACHINES

Electrically Operated—Air Controlled

... *Drilling*—TYPE "UD"

Capacities from #60 through $\frac{3}{8}$ " in two sizes

... *Tapping*—TYPE "UT"

Capacities from #0 through $\frac{3}{4}$ " in four sizes

... *Threading*—TYPE "TR"

Capacities up to 1" in two sizes

AUTOMATIC and SEMI-AUTOMATIC JIGS and FIXTURES

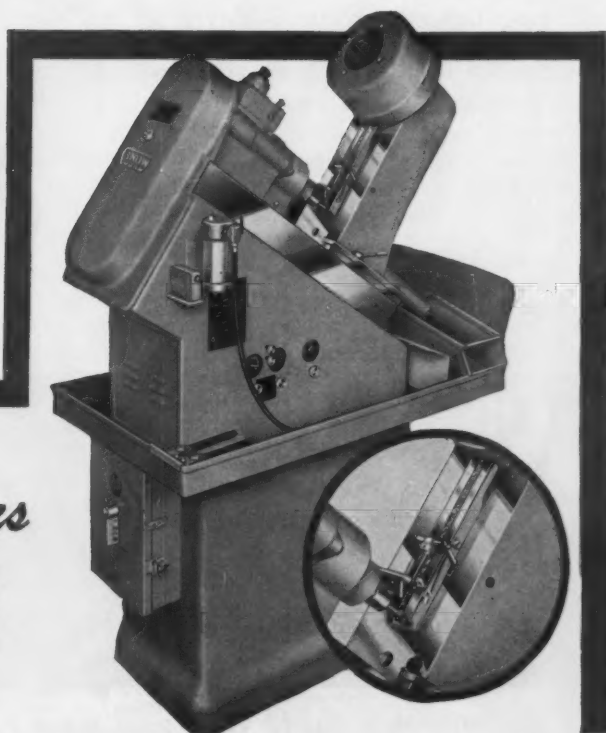
for Indexing and Clamping

A complete line of basic Master Fixtures to permit adaptation of a wide range of parts at high production rate with low tooling cost.

FULL AUTOMATIC

Nut Tapping Machines

Completely automatic hopper feed nut tapping machines up to $\frac{3}{8}$ "—incorporating simplicity and low tooling cost. Standard taps are used. Precision class 3 and 4 fits and parallelism maintained at high speed and high production.



NEW WILLIAMS LOCKING ADJUSTABLE WRENCH

THE ONLY REAL ADJUSTABLE
WRENCH IMPROVEMENT
IN OVER 40 YEARS!

PUSH DOWN TO UNLOCK

AVAILABLE
AT NO EXTRA
COST

PUSH UP TO LOCK

WITH FEATURES

YOU HAVE ALWAYS WANTED IN AN ADJUSTABLE WRENCH

- No Obstructions
- Structurally Sound
- Positive Lock
- Drop-Forged from Selected Alloy Steel and Chrome Plated
- Rapid Adjustment
- One Hand Operation
- No Fumbling

AVAILABLE
IN THREE MOST
POPULAR SIZES

| No. | Size | Capacity | List Price |
|-----|------|------------------|------------|
| 8L | 8" | $1\frac{1}{2}$ " | \$2.45 |
| 10L | 10" | $1\frac{3}{8}$ " | \$3.10 |
| 12L | 12" | $1\frac{1}{2}$ " | \$4.50 |

WILLIAMS

INDUSTRIAL TOOLS

"The Broadest Line of Its Kind"

WRITE for descriptive folder No. A-465. Also ask for Catalog 302 showing the latest patterns and sizes in Williams broad line of industrial tools.



you'll get
SERVICE ON
THE DOUBLE
from your
DISTRIBUTOR'S
SALESMAN.
He'll give
you quickest
delivery at
lowest cost!

J. H. WILLIAMS & CO., 407 Vulcan Street, Buffalo 7, N. Y.

B Product Directory

BABBITT

Boston Gear Works, 3200 Main St., North Quincy, Mass.
Bunting Brass & Bronze Co., Spencer and Carlton Aves., Toledo, Ohio.
Ryerson, Jos. T. & Son, 2558 W. 16th St., Chicago 18, Ill.

BALANCING EQUIPMENT

Anderson Bros. Mfg. Co., 1910 Kishwaukee St., Rockford, Ill.
Cora Corp., 405 Lexington Ave., New York 17.
Gisholt Machine Co. (Static and Dynamic), 1245 E. Washington Ave., Madison 10, Wis.
Morris Machine Tool Co., Inc., 946-M Harriet St., Cincinnati 3, Ohio.
Olson, Tinius, Testing Mch. Co., Willow Grove, Pa.
Orban, Kurt & Co., Inc., 205 E. 42nd St., New York 17, N. Y.
Pope Machinery Corp., Haverhill, Mass.
Snyder Tool & Engrg. Co., 3400 E. Lafayette, Detroit 7, Mich.
Sundstrand Mich. Tool Co., 2531 11th St., Rockford, Ill.
Westinghouse Electric Corp., E. Pittsburgh, Pa.

BALL BEARING TESTERS

Micrometrical Mfg. Co., 321 S. Main St., Ann Arbor, Mich.

BALLS

Kennametal, Inc., Latrobe, Pa.

BARS, Phosphor Bronze

Bunting Brass & Bronze Co., Spencer and Carlton Aves., Toledo, Ohio.

BARS, Steel

Allegheny Ludlum Steel Corp., Bethlehem, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Carpenter Steel Co., Reading, Pa.
Crucible Steel Co. of America, Oliver Bldg., Pittsburgh 30, Pa.
Firth Sterling Inc., 3113 Forbes St., Pittsburgh 30, Pa.
Ryerson, Joseph T. & Son, Inc., 2558 W. 16th St., Chicago 18, Ill.
Timken Roller Bearing Co., Canton, Ohio
U. S. Steel Corp. (American Steel & Wire Co. Div., Carnegie-Illinois Steel Corp. Div., Columbia Steel Co., Div., Tennessee Coal, Iron & R. R. Co. Div.), 436 7th Ave., Pittsburgh, Pa.
Wheelock, Lovejoy & Co., Inc., Cambridge, Mass.

BASES, Machinery Welded

Mahon, R. C., Co., 6565 E. 8 Mile Rd., Detroit 34, Mich.

BEARINGS, Babbitt

Bunting Brass & Bronze Co., Spencer and Carlton Ave., Toledo, Ohio.

BEARINGS, Ball

Ball & Roller Bearing Co., Danbury, Conn.
Boston Gear Works, 3200 Main St., North Quincy, Mass.
Fafnir Bearing Co., New Britain, Conn.
Marlin-Rockwell Corp., 402 Chandler Bldg., Jamestown, N. Y.
New Departure Div., General Motors, Bristol, Conn.
Nice Ball Bearing Co., Nicetown, Philadelphia, Pa.
Norma-Hoffman Bearings Corp., Stamford, Conn.

BEARINGS, Bronze and Special Alloy

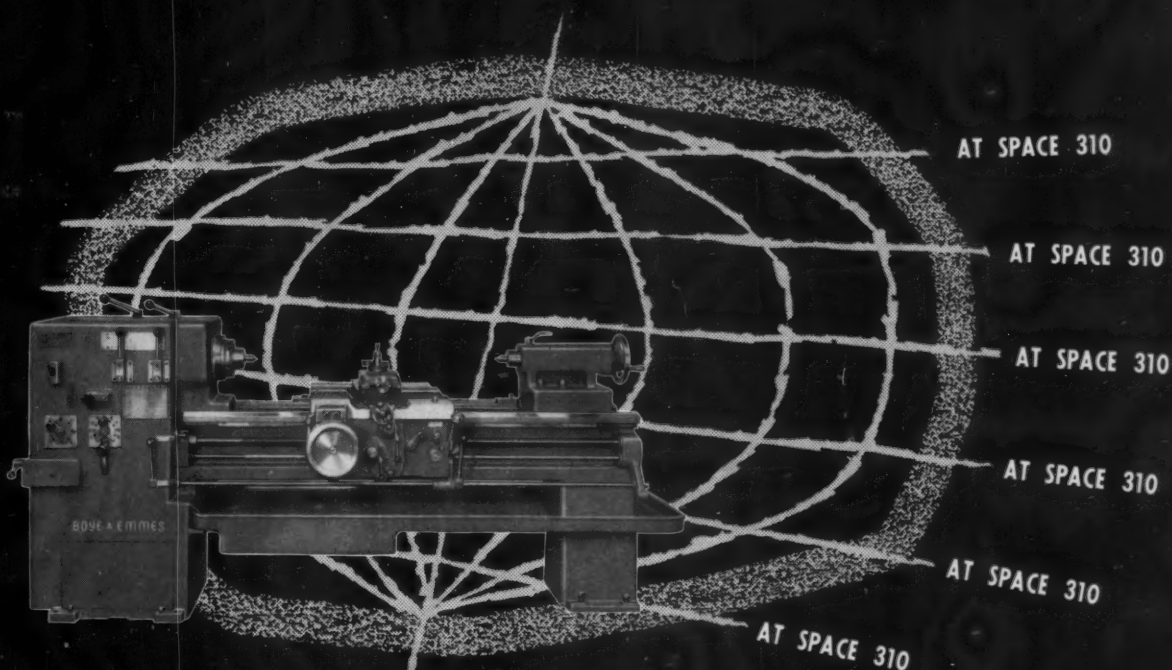
Boston Gear Works, 3200 Main St., North Quincy, Mass.
Bunting Brass & Bronze Co., Spencer and Carlton Ave., Toledo, Ohio.
Haynes Stellite Div., Union Carbide & Carbon Corp., 30 E. 42nd St., New York, N. Y.

(Continued on page 420)

at the machine tool show
AT SPACE 310

the world's best investment . . .

in lathes



It's the brawny, extra rigid Boyé & Emmes Engine Lathe.

The lathe you would have designed for your own use.

See it! Compare it with the finest. You will gain
 a new notion of modern engine lathe design.

Longitudinal power traverse through fingertip electrical controls.

Automatic, electric longitudinal and cross stops operate in either direction of travel.

Hardened and ground lead screw.

Electrically operated brake.

Direct reading longitudinal and crossfeed dials.

Built-in ball bearing tailstock.

Promise yourself the pleasure

. . . at space **310**

BOYÉ & EMMES
 MACHINE TOOL COMPANY
 127 CALDWELL DRIVE
 CINCINNATI 16, OHIO

THE
 MACHINE TOOL
 SHOW
 CHICAGO, ILL.
 SEPT. 8-17, 1966
 INTERNATIONAL EXHIBITION



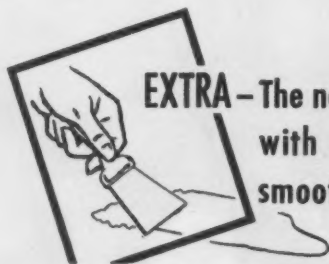
VINOC

LOWE Brothers presents

a new finishing system for high-speed production!

FAST APPLICATION • CLOG-FREE SANDING • IMPERVIOUS TO COOLANTS!

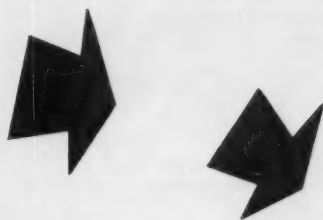
Faster flow of finished castings, reduced handling costs, finishes that resist modern high-speed coolants — *these* are the demands of today's production. Lowe Brothers "Finishing Specialists" have once more demonstrated their leadership by developing VINOC, a finishing system which meets every modern requirement, yet maintains the highest standards of beauty and wearability which made the Lowe Brothers name great!



EXTRA — The new filler in the VINOC system glazes with unprecedented ease, speed and smoothness with knife or squeegee!



ENGINEERED QUALITY



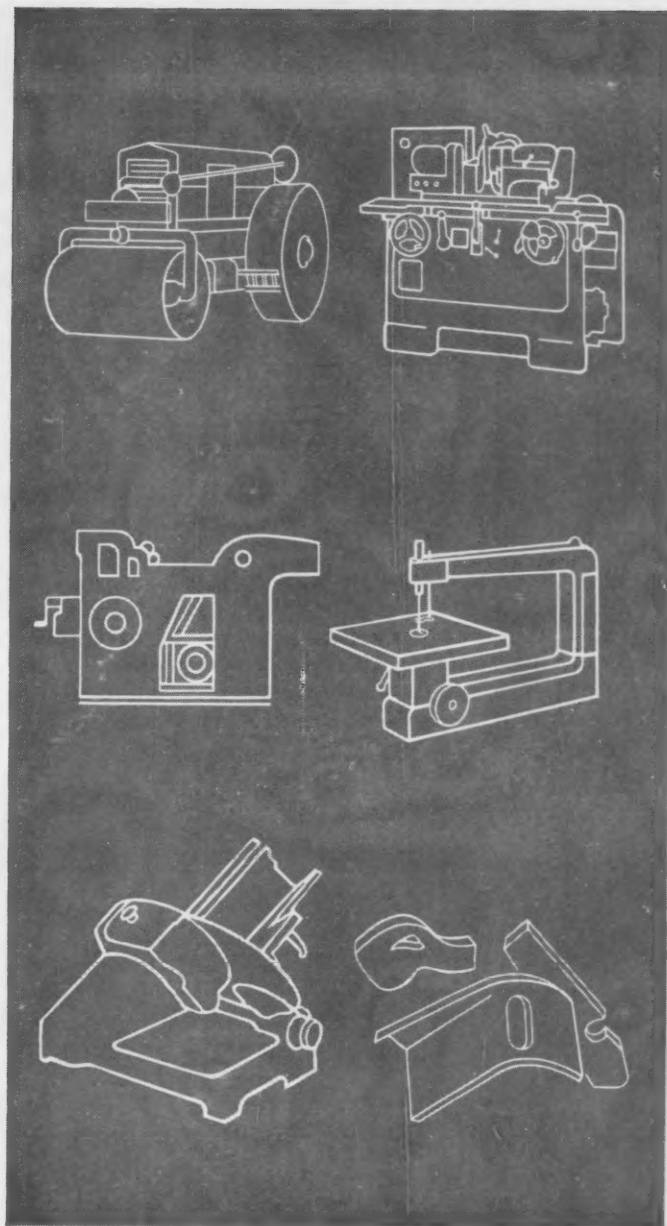
IMPROVED RESISTANCE TO MODERN HIGH-SPEED COOLANTS! Lowe Brothers **VINOC** finishes have proved impervious to all modern coolants to which they have been subjected—to keep in stride with today's requirements of streamlined production techniques!

FASTER, ECONOMICAL CLOG-FREE SANDING! Pigmentation of Lowe Brothers new filler is such that it does not clog sandpaper! It sands easier—desired smoothness is realized in less time with much less work! What's more, you enjoy a marked savings on sandpaper alone!

FASTER DRYING! Lowe Brothers **VINOC** system reduces drying time to a new low—speeds handling. Materials dry free of "pinholing"—as a result there's no re-working necessary!

IMPROVED RESISTANCE TO IMPACT AND COMPRESSION! Large castings take plenty of shocks and scuffs during plant handling operations. Lowe Brothers **VINOC** finishes are made tougher to resist this rough treatment and thereby reduce need for patch work.

Lowe Brothers new **VINOC** finishing system is available for either cold or hot lacquer application. Get full details now—see how you can save time and cost while getting finest finishing results with Lowe Brothers' up-to-the-minute answer to the most modern production needs—**VINOC**! Write today for prompt service without obligation.



LOWE Brothers

FINISHES FOR INDUSTRY SINCE 1870



The Lowe Brothers Company • Dayton 2, Ohio
Industrial Division

District Offices: Atlanta • Boston • Dallas
Chicago • Jersey City • Kansas City

Here's The Way To Get Production Up!

Everyone in industry wants production up... and tool costs down. It is simply good business. A good way to do this is to always be certain you are using tools with real "cutting-mileage" built into them. Chicago-Latrobe Reamers are these kind of tools.

Our files contain an almost unlimited number of testimonials from production people of the important industries. There is one point of similarity in the letters... they all say, in one way or another, "we never fail to get increased production from our machines when we use Chicago-Latrobe cutting tools." You can experience the same results... try them and see.

CHICAGO-LATROBE

Double-Circle Reamers

Better Service, too!

Dealing with a Chicago-Latrobe distributor gives a two-way advantage. You get, (1), the fastest service, and (2), drilling and reaming counsel from trained experts. Contact him soon.

THERE'S MORE PRODUCTION IN
CHICAGO-LATROBE REAMERS!



Chicago-Latrobe

417 WEST ONTARIO STREET • CHICAGO 10

• DRILLS • COUNTERSINKS • CARBIDE TOOLS
• REAMERS • COUNTERBORES • SPECIAL TOOLS

BEARINGS, Lineshaft

Fafnir Bearing Co., New Britain, Conn.
Orange Roller Bearing Co., Inc., Orange, N. J.
Standard Pressed Steel Co., Jenkintown, Pa.

BEARINGS, Needle

Orange Roller Bearing Co., Inc., Orange, N. J.

BEARINGS, Roller

Ball & Roller Bearing Co., Danbury, Conn.
Fafnir Bearing Co., New Britain, Conn.
Marlin-Rockwell Corp., 402 Chandler Bldg.,
Jamestown, N. Y.
Norma-Hoffman Bearings Corp., Stamford,
Conn.
Orange Roller Bearing Co., Inc., Orange, N. J.
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(Continued on page 422)



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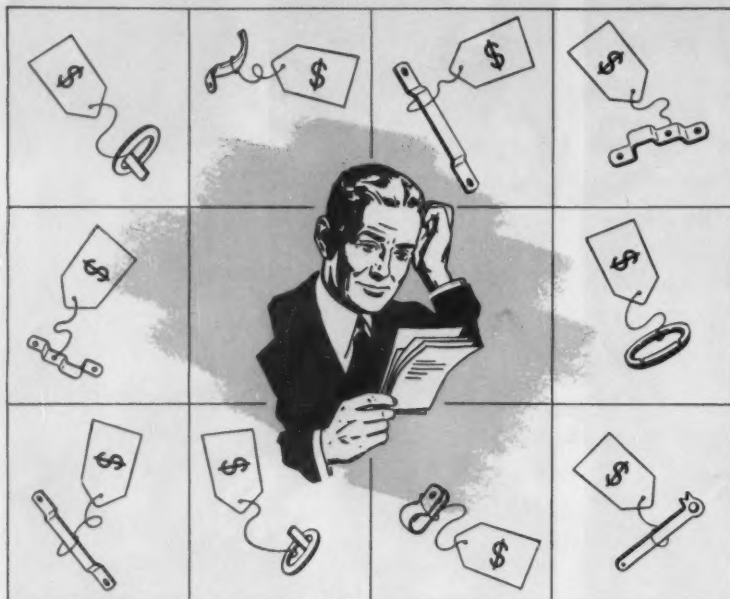
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(Continued on page 424)

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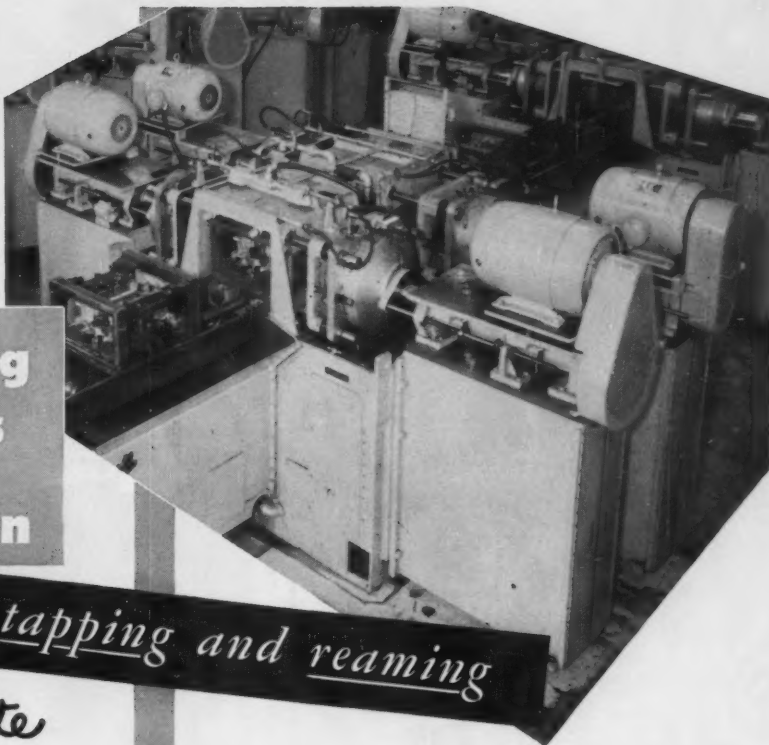
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Axelson Mfg. Co., 6160 S. Boyle Ave., Los
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(Continued on page 428)

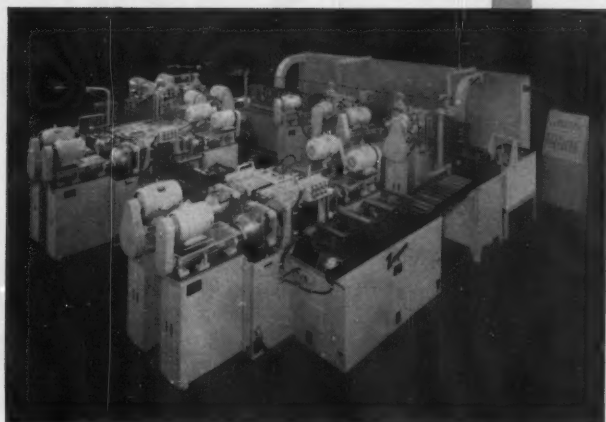
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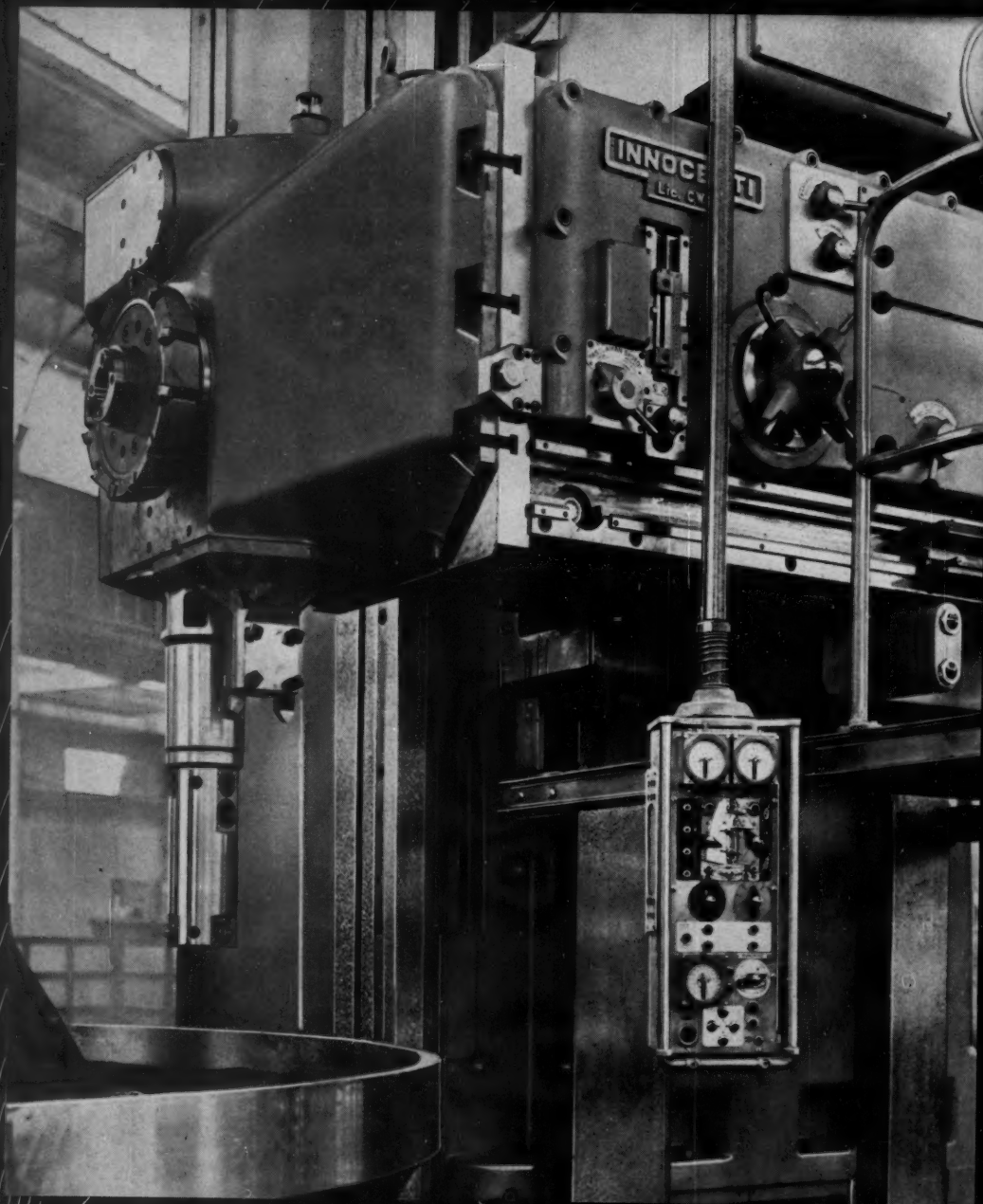
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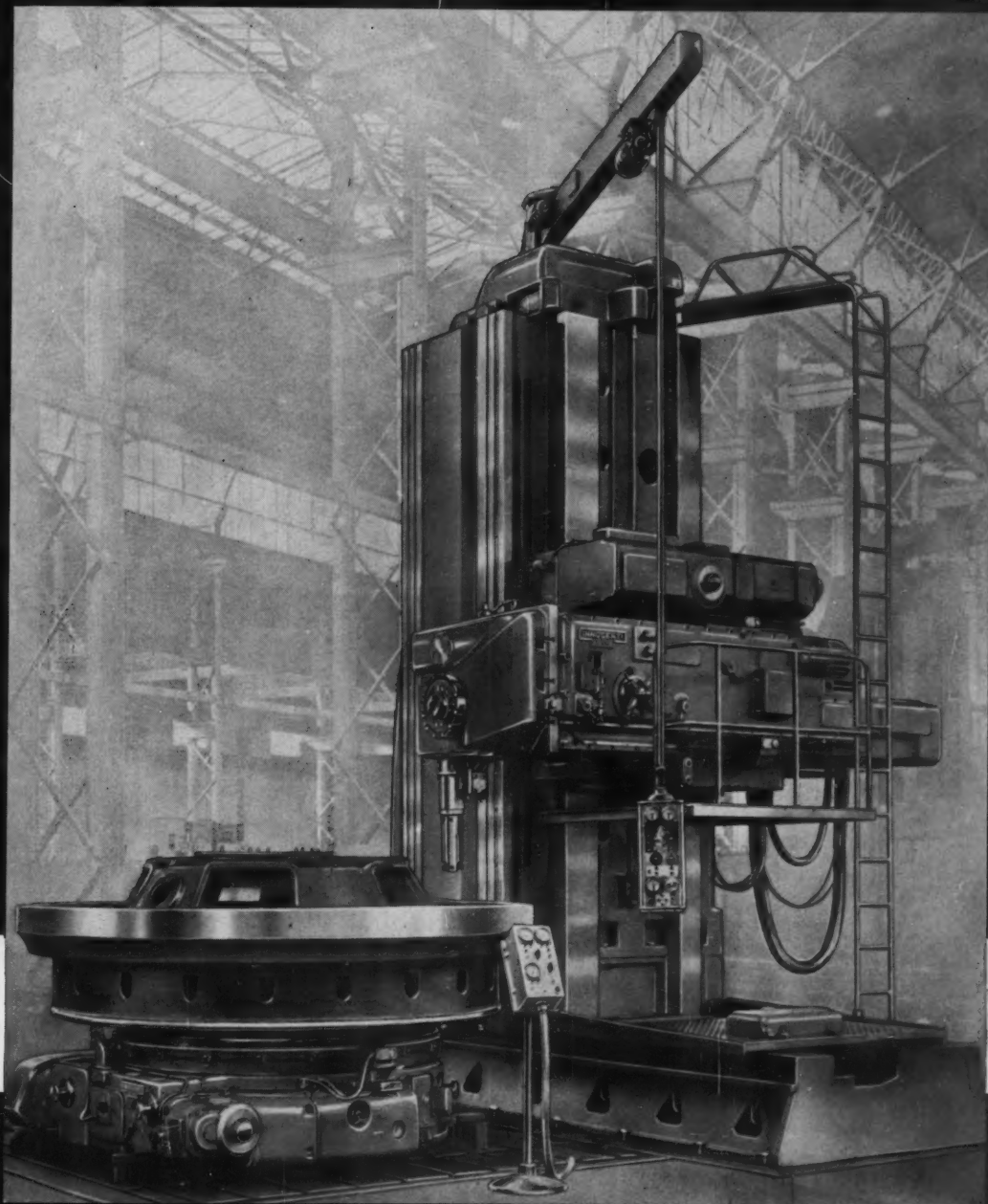
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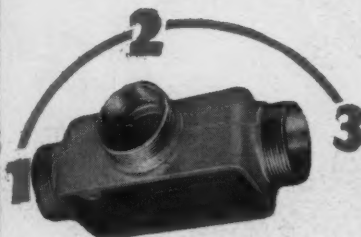
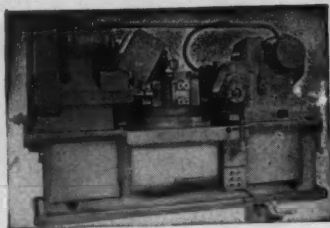
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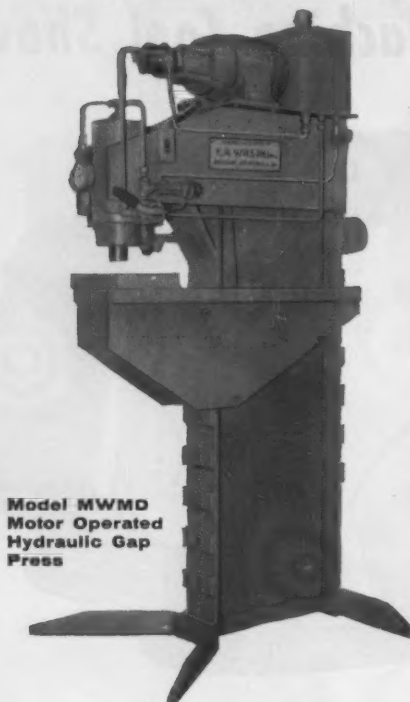
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Erie Foundry Co., Erie, Pa.
Lake Erie Engineering Corp., Kenmore Station, Buffalo, N. Y.
Verson Allsteel Press Co., 93rd St. & S. Kenwood Ave., Chicago, Ill.

BURS

See Files and Burs, Rotary

BUSHINGS, Brass, Bronze, Carbide, Etc.

Bunting Brass & Bronze Co., Spencer and Carlton Aves., Toledo, Ohio.
Haynes Stellite Div., Union Carbide & Carbon Corp., 30 E. 42nd St., New York
Kennametal, Inc., Latrobe, Pa.

(Continued on page 434)

the ONE COMPLETE Tool Line



Yes, one look at Davis and you're sure to agree that here is industry's most complete standard tool line. One quick check of its unparalleled range of types, sizes and cutter materials will convince you that only Davis offers the full advantages of one-source buying for all your boring, turning and planing requirements.

Here, too, at Davis you'll see designs from the one engineering group with the vision and background of metal working experience to produce special tooling of outstanding efficiency. So whatever your needs . . . at the show and in the shop . . . it's always good advice to see Davis first for the best in tooling.

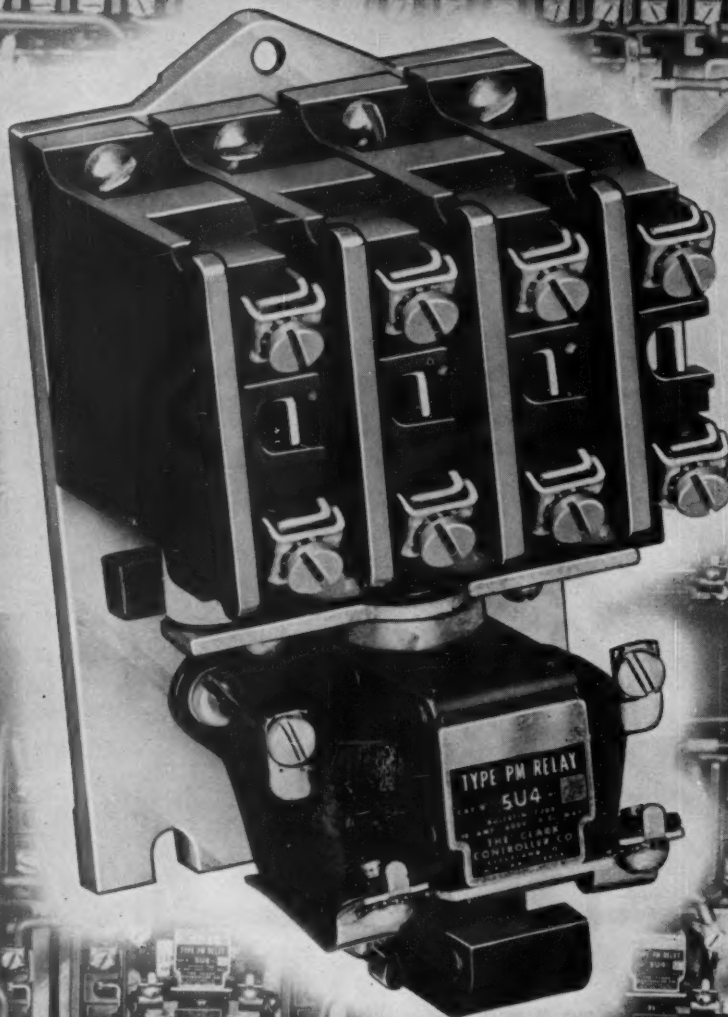
DAVIS

BORING TOOL DIVISION OF
Giddings & Lewis Machine Tool Company
Fond du Lac, Wisconsin

Write for YOUR DAVIS
CATALOG 304

THE ONE NAME THAT CERTIFIES ULTIMATE PRECISION AND PRODUCTIVITY IN TOOLING

NEW!...



***Another
CLARK
First!***

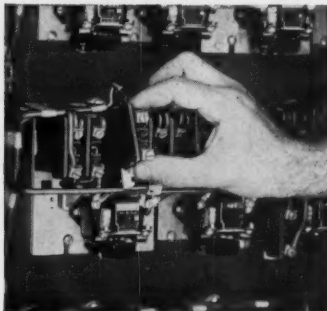
CLARK CONTROL RELAYS

This new line of CLARK Type "PM" magnetic relays introduces a revolutionary new concept in relay design: SECTIONAL POLE CONSTRUCTION. Sectional Pole Construction permits the addition of many advantages not found in any other 10-ampere relay. An outstanding feature is maximum utility of panel space.

• COMPLETE LINE—2 TO 12 POLES

New CLARK Type "PM" Relays feature the most complete range of models, sizes and combinations available in one integrated line. There are specific models to meet virtually all demands of Industry for 10-ampere relays as determined by an extensive study of relay usage. Type "PM" relays are further designed to meet practically every installation condition, panel arrangement or space requirement. Mounting dimensions are universally standard and design uses a minimum number of parts with maximum interchangeability.

• SECTIONAL POLE CONSTRUCTION MEANS HEAVY-DUTY RELAY IN SMALL SPACE



Each pole is an integral unit that can be removed, installed or replaced from the front without disturbing other poles (See illustration). Individual poles are contained in separate melamine housings, forming individual arcing chambers for each set of contacts. A short circuit is confined to one pole and will not destroy the whole relay. The top of the pole is protected by a melamine cover—molded in one piece with the side—preventing failure from dust and dirt, and serving as a space-saving wiring shelf.

• ALL WIRING AND MAINTENANCE —FROM THE FRONT

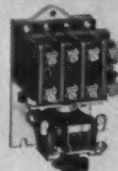
All terminals and pole-mounting screws are on the *front* where they are easiest to get at. Only two wires and one mounting screw to remove when replacing a pole. Contacts can be inspected from the front. They can be quickly and easily converted from normally open to normally closed and vice versa. Coil-changing or magnet replacement can be done from the front without removing the relay from the panel. Only $\frac{7}{8}$ inches clearance required below relay for coil replacement.

• PRE-ASSEMBLED POLE AND MAGNET KITS —AVAILABLE FOR QUICK MAINTENANCE

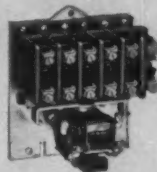
Extra pole assemblies for all models are available in packaged kits—either normally open or normally closed—a big time saver for maintenance men. Clearly labelled packaged coils and complete magnet assemblies are also available in kit form.

SEE THIS NEW RELAY at The Clark exhibit, PRODUCTION ENGINEERING SHOW, Booth 840, Navy Pier, Chicago
September 6-16, 1955

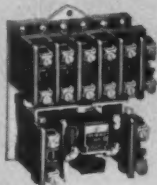
10 STANDARD RELAYS FROM 6 BASIC MODELS



Catalog No. 5U4
Standard 4-pole relay. With one or two poles removed, this model becomes the standard 3 or 2-pole relay respectively.



Catalog No. 5U6
Standard 6-pole relay. Poles are interchangeable with 4-pole relay. Mounting dimensions are the same—lining up perfectly when mounted side-by-side with 5U4.



Catalog No. 5U8
Standard 8-pole relay made by mounting 2 poles beside magnet on 5U6. This is the first 8-pole relay available with single deck wiring.



Catalog No. 5UK8
Alternate 8-pole relay with double-deck construction—designed to fit perfectly when mounted side-by-side with 10 and 12 pole relays and NEMA standard size 1 starters.



Catalog No. 5U12
Compact double-deck relay for 12-poles. Mounting dimensions identical with NEMA standard size 1 starters. With 2 poles removed, this becomes the standard 10-pole relay.



Catalog No. 5UK2
Alternate 2-pole relay designed to meet small or unusual space requirements. Less than 3 inches overall height.

Write for 8-page illustrated bulletin giving complete information about this revolutionary new CLARK "PM" RELAY line.

The **CLARK**  **CONTROLLER** *Company*
Engineered Electrical Control 1146 East 152nd Street • • Cleveland 10, Ohio

IN CANADA: CANADIAN CONTROLLERS, LIMITED • MAIN OFFICES AND PLANT, TORONTO

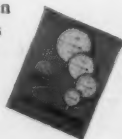


... the preferred dial indicators

TIME-TESTED FOR ACCURACY AND DEPENDABLE PERFORMANCE!

For more than half a century, industry has relied on Ames indicators for help in the solution of measurement problems of all kinds. And through the years, Ames indicators have done their jobs superlatively well. The Ames reputation for extreme accuracy, ruggedness and reliability through many millions of cycles is due to an unswerving dedication to our original guiding principle—to make the best possible indicators and gauges, through constant research and the use of highest quality materials and expert craftsmanship.

We will gladly make recommendations on your measurement problems. Please send blueprints and specifications. And ask for your free copy of the Ames catalog.



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27 Ames Street, Waltham 54, Mass.

MANUFACTURER OF MICROMETER DIAL GAUGES • MICROMETER DIAL INDICATORS

434—MACHINERY, September, 1955

BUSHINGS, Hardened

Colonial Bushings, Inc., 31780 Groesbeck Hwy., Fraser, Mich.
Darily Machine Specialties, Inc., 2107 S. 52nd Ave., Chicago 50, Ill.
Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit 32, Mich.
Leland-Giffard Co., 1925 Southbridge St., Worcester, Mass.
U. S. Steel Co., Inc., 436 7th Ave., Pittsburgh, Pa.
U. S. Tool Co., Inc., 255 N. 18th St., Ampere, N. J.

BUSHINGS, Jig

Colonial Bushings, Inc., 31780 Groesbeck Hwy., Fraser, Mich.
Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit 32, Mich.
Universal Engrg. Co., Frankenmuth, Mich.

CABINETS, Tool

Armstrong Bros. Tool Co., 5200 W. Armstrong Ave., Chicago, Ill.

CALIPERS

Ames, B. C., & Co. (Dial) Waltham 54, Mass.
Brown & Sharpe Mfg. Co., Providence, R. I.
Lufkin Rule Co., Hess Ave., Saginaw, Mich.
Millers Falls Co., Greenfield, Mass.
Scherr, George, Co., Inc., 200 Lafayette St., New York 12, N. Y.
Starret, The L. S., Co., Athol, Mass.
Taft-Peirce Mfg. Co., Woonsocket, R. I.

CAM CUTTING MACHINES

Cosa Corp., 405 Lexington Ave., New York 17, N. Y.
Fellows Gear Shaper Co., Springfield, Vt.
Frew Machine Co., 121 East Luray St., Philadelphia 20, Pa.
Prait & Whitney, West Hartford 1, Conn.
Sunstrand Machine Tool Co., 2351 11th St., Rockford, Ill.

CAM MILLING AND GRINDING MACHINES

Baird Machine Co., 1700 Stratford Ave., Stratford, Conn.
Cincinnati Milling Machine Co., Oakley, Cincinnati, Ohio.
Landis Tool Co., Waynesboro, Pa.
Orban Kurt & Co., Inc., 205 E. 42nd St., New York 17, N. Y.
Rowbottom Machine Co., Waterbury, Conn.

CAMS

Eisler Engrg. Co., Inc., 760 S. 13th, Newark 3, N. J.
Hartford Special Machry. Co. 287 Homestead St., Hartford, Conn.
Rowbottom Machine Co., Waterbury, Conn.

CARBIDES, TANTALUM, TITANIUM AND TUNGSTEN

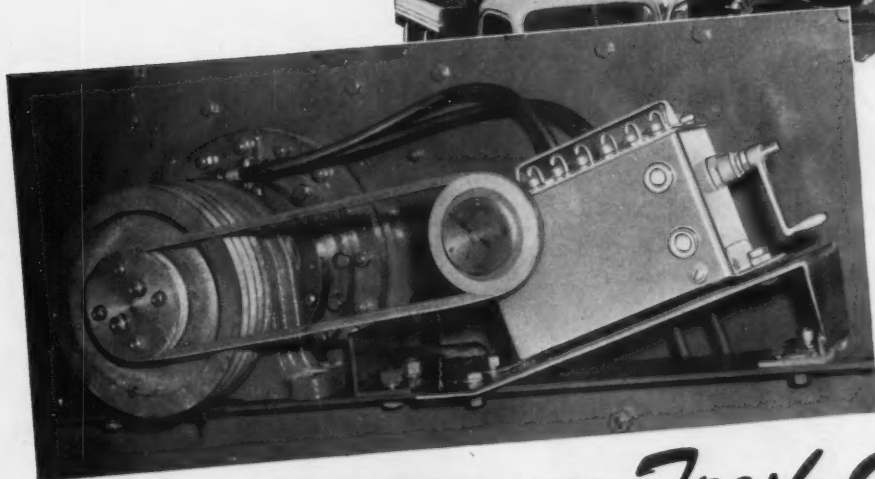
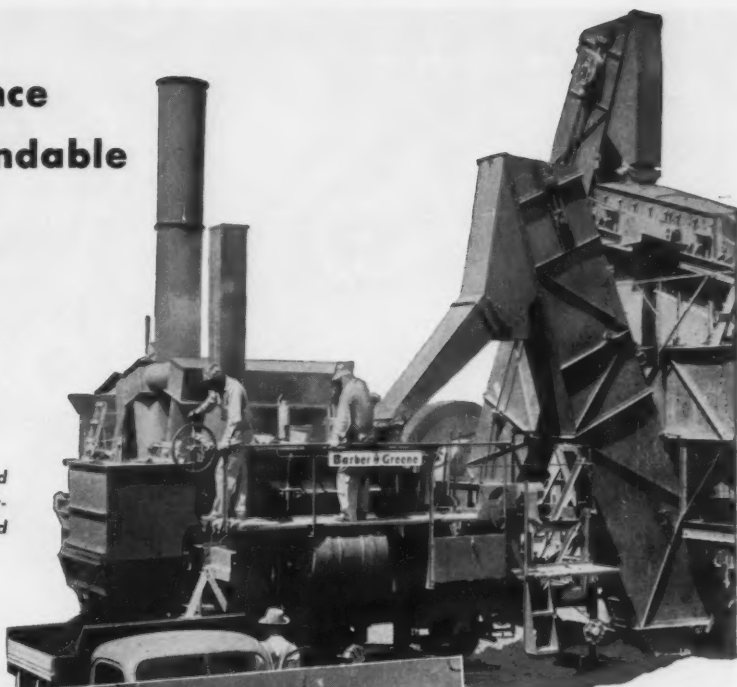
Allegheny Ludlum Steel Corp., Pittsburgh, Pa.
Carboloy Dept., General Electric Co., Box 237, Roosevelt Park Annex, Detroit 32, Mich.
Firth Sterling, Inc., 3113 Forbes St., Pittsburgh 30, Pa.
Jarvis Corp., Middletown, Conn.
Kennametal, Inc., Latrobe, Pa.
Metal Carbides Corp., Youngstown, Ohio.
Super Tool Co., 21650 Hoover Rd., Detroit 13, Mich.
Wesson Co., 1220 Woodward Heights Blvd., Ferndale, Mich.
Wesson Metal Corp., Lexington, Ky.
Wiley's Carbide Tool Corp., 1340 W. Vernon Hwy., Detroit 1, Mich.

CASEHARDENING FURNACES

See Furnaces, Heat-Treating
(Continued on page 438)

**machines of
great performance
use the most dependable
oiling system
ever developed**

A Model 50 Madison-Kipp Lubricator installed as original equipment on a Model 848 Barber-Greene Asphalt Mixing Plant manufactured by Barber-Greene Co., Aurora, Illinois.



MADISON-KIPP *Fresh Oil*

... by the measured drop, from a Madison-Kipp Lubricator is the most dependable method of lubrication ever developed. It is applied as original equipment on America's finest machine tools, work engines and compressors.

You will definitely increase your production potential for years to come

by specifying Madison-Kipp on all new machines you buy where oil under pressure fed drop by drop can be installed.

There are 6 models to meet almost every installation requirement.



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203 WAUBESA STREET • MADISON 10, WIS., U. S. A.

• Skilled in Die Casting Mechanics • Experienced in Lubrication Engineering • Originators of Really High Speed Air Tools

For more information on products advertised, use Inquiry Card, page 325

MACHINERY, September, 1955—435

MORRIS AIR-OIL-MATIC DRILL UNITS



Fast, low-cost production for drilling and allied operations.

- Adjustable Feed
- Wide range of spindle speeds
- Convenient controls
- Hydraulically controlled

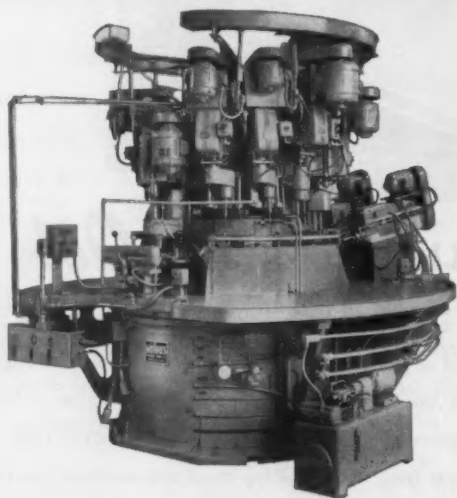
Available for use on Special Purpose Machines like the MORRIS High Production Machines illustrated.

MORRIS CAM-MATIC DRILL UNITS



Newly introduced, MORRIS CAM-MATIC Drill Units provide automatic, electrically controlled, mechanically driven drilling, tapping and allied operations ... with built-in accuracy, dependability and convenience. Specially-featured electric clutch provides automatic thrust control and dull or broken drill detection.

Morris MOR-SPEED



MORRIS HIGH PRODUCTION MACHINES

Special Operations with STANDARD Units

- Specialized Production
- Automatic Indexing and Positioning
- Multiple Operations
- Easy Model Changeover

You can have swift, accurate production on multiple operations like drilling, reaming and tapping with MORRIS Mor-Speed High Production Machines. They provide special operations using standard units, with completely automatic operation. Easy re-alignment speeds model changeovers.



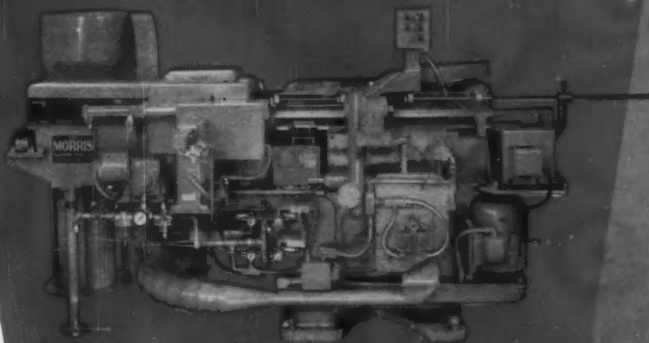
MORRIS MOR-SPEED RADIAL DRILLS

4 SIZES - 2 NEW UNITS
Centralized Controls

A complete line of heavy and light production radial drills feature centralized controls for ease of operation, fast production. Two new models utilize hydraulic control for push-button operation and pre-selected feeds and speeds ... the easiest, fastest operation ever available.

MORRIS AUTOMATIC BALANCING MACHINES

**all
new**



COMPLETELY AUTOMATIC from load to unload, these machines produce up to 720 perfectly balanced pistons every hour. Units are balanced within one gram plus or minus for extreme accuracy required in finished product.

MACHINE TOOLS

Designed for Production PLUS Precision

NEW . . . with proven performance, that's the story of these up-to-the-minute models of MORRIS Machine Tools. For more than 40 years, MORRIS has designed and manufactured high speed, precision equipment. The new models displayed on these two pages are the latest in a series of machine tools that have won the favor of the nation's leading manufacturers.

Your built-in benefit with these new MORRIS Mor-Speed Machine Tools is precise work at high speeds. Make your own comparison of MORRIS features with those of any unit. You'll see why the leaders demand MORRIS!

MORRIS MOR-SPEED MACHINE TOOLS have been selected by the world's leading manufacturers for low-cost mass production of precision-made parts and assemblies. Complete case history data is available FREE upon request.

Write today for catalogs concerning specific machines. If you prefer, outline your production problem. MORRIS engineers will make recommendations for its best solution.



Morris



VISIT US AT BOOTH #912

The Machine Tool Show

Chicago, Illinois

Sept. 6-17, 1955

International Amphitheater

THE MORRIS MACHINE TOOL COMPANY

946 MARSHY STREET, CINCINNATI 2, OHIO, U. S. A.



Magna-Lock Magnetic Chuck

at Turchan Follower Machine Company

REDUCES SETUP TIME 66.6%

THE JOB: Milling hard cast iron gibs, $1\frac{3}{8}$ " maximum width, variable lengths, 60° compound angle, $.250$ " taper per foot. Roughing cut: $1\frac{3}{8}$ " max. width, 0.200 " depth. Finishing cut: $1\frac{3}{8}$ " max. width, 0.050 " depth. Spindle speed: 385 RPM. Cutter: 8-flute carbide tip 3 " dia. Table speed: 15 IPM-20 IPM. Stock removal: Approximately 4 cu. in. per min. Fixture: mechanical.

THE PROBLEM:

1. Fixture setup time and handling was 60 minutes plus time required to lay out, drill and tap holes in the gibs to coincide precisely with the bolts of the fixture. Spacing varied between 9 " and 10 " at several intermediate increments.
2. The holes were not functional parts of the gibs, being used only to hold the gibs while being milled.
3. Because of the several milling operations, the gib had to be removed each time and re-bolted to the fixture.

THE SOLUTION: A Hanchett MAGNA-LOCK Magnetic Rectangular CHUCK positioned on a sine bar, the milling machine cutter spindle being swiveled to the corresponding angles.

THE RESULT:

1. FIXTURE SETUP AND HANDLING TIME — 20 MINUTES.
2. Lay out, drilling and tapping operations eliminated.
3. Time required to re-bolt gibs on fixture for each operation eliminated.

You, too, can increase your machines' productivity with Hanchett Magna-Lock Magnetic Chucks and Devices. Take advantage of Magna-Lock's experience and engineering know-how — at your service to help you solve your holding problems. Magna-Lock is the only *exclusive* manufacturer of magnetic chucks and devices. WRITE TODAY, Dept. M-95.

Request Magna-Lock as original equipment on your new machines.

Hanchett MAGNA-LOCK



CORPORATION

Magnetic Chucks and Devices

BIG RAPIDS, MICHIGAN, U. S. A.

CASTINGS, Aluminum, Brass, Bronze, Magnesium, Etc.

Baldwin-Lima-Hamilton Corp., Eddystone Div., Philadelphia 42, Pa.
Bethlehem Steel Co. (Brass and Bronze only), Bethlehem, Pa.
Bunting Brass & Bronze Co., Spencer and Carlton Aves., Toledo, Ohio.
Mueller Brass Co., Port Huron 35, Mich.

CASTINGS, Die

American Brass Co., Waterbury 20, Conn.
Lehigh Foundries, Inc., 1500 Lehigh Dr., Easton, Pa.
Madison-Kipp Corp., Madison, Wisc.

CASTINGS, Iron

Axelson Mfg. Co., 6160 S. Boyle Ave., Los Angeles 58, Cal.
Baldwin-Lima-Hamilton Corp., Lima Hamilton Div., Hamilton, Ohio.
Bethlehem Steel Co., Bethlehem, Pa.
Brown & Sharpe Mfg. Co., Providence, R. I.
Chambersburg Engineering Co., Chambersburg, Pa.
Lehigh Foundries, Inc., 1500 Lehigh Dr., Easton, Pa.

CASTINGS, Steel, Alloys, Etc.

Allegheny Ludlum Steel Corp., Pittsburgh, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Birdsboro Steel Fdry. & Mch. Co., Birdsboro, Pa.
Haynes Stellite Div., Union Carbide & Carbon Corp., 30 E. 42nd St., New York
U. S. Steel Corp., Columbia Steel Co., Div., 436 7th Ave., Pittsburgh, Pa.

CEMENT, Disc Grinding Wheel

Walls Sales Corp., 333 Nassau Ave., Brooklyn 22, N. Y.

CENTERING MACHINES

Baldwin-Lima-Hamilton Corp., Lima Hamilton Div., Hamilton, Ohio.
Consolidated Mch. Tool Corp., Rochester, N. Y.
Espin-Lucas Machine Works, Front St., and Girard Ave., Philadelphia, Pa.
Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit 32, Mich.
Jones & Larson Mch. Co., Springfield, Vt.
Millholland, W. K., Machinery Co., 6402 Westfield Blvd., Indianapolis 5, Ind.
Seneca Falls Mch. Co., Seneca Falls, N. Y.
Snyder Tool & Engrg. Co., 3400 E. Lafayette, Detroit 7, Mich.
Sunstrand Machine Tool Co., 2531 11th St., Rockford, Ill.

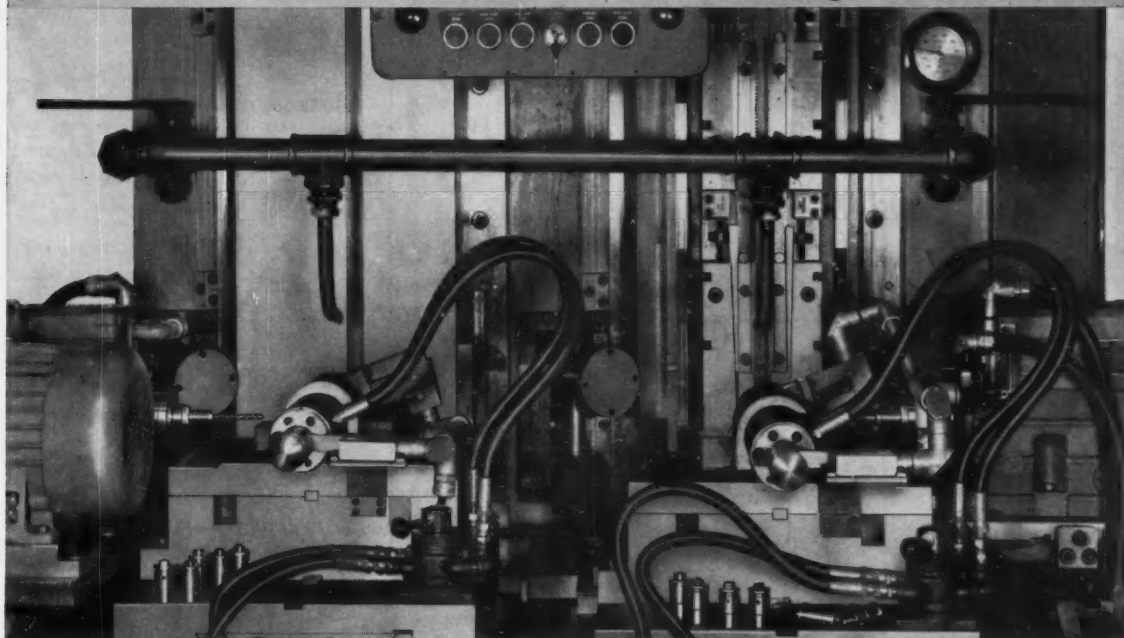
CENTERS, Lathe

Axelson Mfg. Co., 6160 S. Boyle Ave., Los Angeles 58, Cal.
Carboloy Dept., General Electric Co., Box 237, Roosevelt Park Annex, Detroit 32, Mich.
Chicago-Latrobe Twist Drill Works, 411 W. Ontario St., Chicago, Ill.
Cleveland Twist Drill Co., Cleveland, Ohio.
Eclipse Counterbore Co., 1600 Bonner Ave., Ferndale, Mich.
Firth Sterling, Inc., 3113 Forbes St., Pittsburgh 30, Pa.
Haynes Stellite Div., Union Carbide & Carbon Corp., 30 E. 42nd St., New York.
Kennametal, Inc., Latrobe, Pa.
Metal Carbides Corp., Youngstown, Ohio.
Scully-Jones & Co., 1903 Rockwell St., Chicago 8, Ill.
South Bend Lathe Works, Inc., 425 E. Madison St., South Bend, Ind.
Super Tool Co., 21650 Hoover Rd., Detroit 13, Mich.
Wesson Co., 1220 Woodward Heights Blvd., Ferndale, Mich.
Union Twist Drill Co., Athol, Mass.
Whitman & Barnes, 40600 Plymouth Rd., Plymouth, Mich.

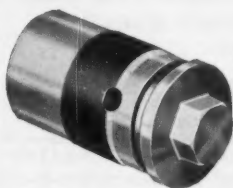
(Continued on page 440)

Detroit Broach **COMBINES STANDARD UNITS**

to cut labor costs and boost production



**HEX BROACHED and HOLE DRILLED
IN ONE OPERATION — 225 TIMES PER HOUR!**

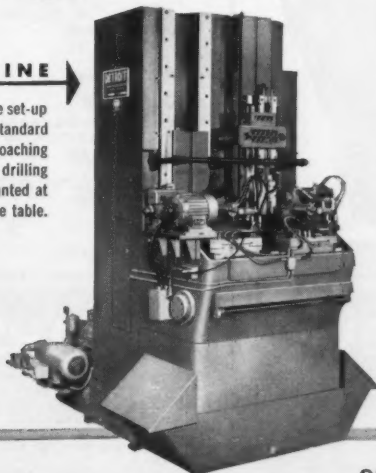


THE PART

A pressure regulator for automatic transmissions. Note the hex on the end and the blind hole on the side . . . both are produced in this tooling set-up.

THE MACHINE

A complete view of the set-up on a Detroit Broach standard 5-ton, twin ram broaching machine. The left drilling unit can be seen mounted at the side of the shuttle table.



By adding to a standard Detroit Broach surface broaching machine two standard Ex-Cell-O drilling spindles, both broaching and drilling are performed at once in this set-up, which features full interlock and is virtually foolproof. The part is held in a collet which indexes during the broaching stroke to produce the hex. At the end of the stroke, the blind hole is drilled automatically. Maintenance is extremely simple and the standard units may be used for other applications should the present operation be discontinued.

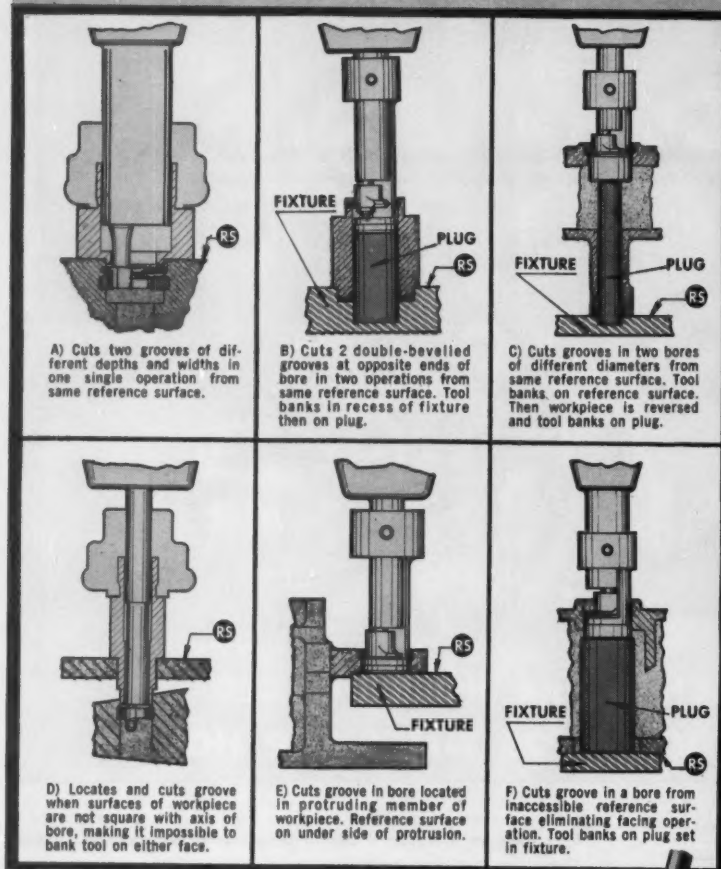
Important, too, is the fact that the hole is accurately positioned in relation to the hex. This same advantage can be applied to operations other than drilling as well.

Lowered labor costs, flexibility of set-ups and high output are keynotes of Detroit Broach engineering. In your plant, Detroit Broach can doubtless show similar savings on many of your present operations.

Detroit Broach
COMPANY
ROCHESTER, MICHIGAN

OFFICES IN PRINCIPAL CITIES THROUGHOUT THE WORLD

Even Unskilled Labor Can Use This Versatile Tool Accurately! It Simplifies Internal Grooving Problems, Cuts Production Costs!



Amazingly versatile! Your toughest recess cutting problems can be met simply and efficiently with the Walde Truarc Grooving Tool because it offers a whole range of possibilities beyond the range of ordinary recessing tools.

Wide Cutting Range! The Walde Truarc Grooving Tool comes in 5 models...enabling you to cut accurate grooves in housings with diameters from .250 to 5.00 inches.

Send Your Problems to Walde! Send us your blueprints...let Walde Truarc Engineers give you a complete analysis, price quotation and delivery information on the most economical tool set-up for your particular job. There is no obligation!

Write NOW for a 20-page manual containing full information on Walde Truarc Grooving Tool



WALDES
TRUARC
GROOVING TOOL

Made by the Manufacturers of Walde Truarc Retaining Rings
WALDES KOHINOOR, INC., 47-16 Austel Place, L.I.C. 1, N. Y.
Walde Truarc Grooving Tool Manufactured
Under U. S. Pat. 2,411,426

MO77

Walde Kohinoor, Inc., 47-16 Austel Pl., L.I.C. 1, N. Y.

Please send me your new 20-page technical manual on the Walde Truarc Grooving Tool. (GT-2-53)

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CHAINS, Power Transmission and Conveyor

Boston Gear Works, 3200 Main St., North Quincy, Mass.
Philadelphia Gear Works, Erie Ave. and G St., Philadelphia, Pa.

CHISELS AND CHISEL BLANKS

Bethlehem Steel Co., Bethlehem, Pa.
Chicago Pneumatic Tool Co., 6 E. 44th St., New York, N. Y.

CHUCKING MACHINES

Axelson Mfg. Co., 6160 S. Boyle Ave., Los Angeles 58, Cal.
Baird Machine Co., 1700 Stratford Ave., Stratford, Conn.
Bardons & Oliver, Inc., Ft. W. 9th St., Cleveland 13, Ohio.
Bullard Co., Brewster St., Bridgeport 2, Conn.
Cleveland Automatic Machine Co., 4932 Beech St., Cincinnati 12, Ohio.
Gisholt Machine Co., 1245 E. Washington Ave., Madison 10, Wis.
Goss & DeLeeuw Mch. Co. (Multiple Spindle), Kensington, Conn.
Heald Machine Co., 10 New Bond St., Worcester 6, Mass.
Jones & Lamson Mch. Co., 160 Clinton St., Springfield, Vt.
National Acme Co. (Single and Multiple Spindle) 170 E. 131st St., Cleveland, Ohio.
Potter & Johnston Co., 1027 Newport Ave., Pawtucket, R. I.
Sunstrand Mch. Tool Co., 2531 11th St., Rockford, Ill.
Warner & Swasey Co., 5701 Carnegie Ave., Cleveland 83, Ohio.

CHUCKS, Air Operated

Axelson Mfg. Co., 6160 S. Boyle Ave., Los Angeles 58, Cal.
Cushman Chuck Co., Windsor Ave., Hartford 2, Conn.
Gisholt Machine Co., 1245 E. Washington Ave., Madison 10, Wis.
Logansport Machine Co., Inc., 810 Center Ave., Logansport, Ind.
Schroders Son, A., 470 Vanderbilt Avenue, Brooklyn, N. Y.
Skinner Chuck Co., 344 Church St., New Britain, Conn.
Tomkins-Johnson Co., Jackson, Mich.
Zagar Tool, Inc., 24000 Lakeland Blvd., Cleveland 23, Ohio.

CHUCKS, Collet or Split

See Collets

CHUCKS, Diaphragm

DoAll Co., 254 N. Laurel Ave., Des Plaines, Ill.
Gleason Works, 1000 University Ave., Rochester, N. Y.
Van Norman Co., 2640 Main St., Springfield 7, Mass.
Woodworth, N. A. Co., 1300 E. Nine Mile Rd., Detroit 20, Mich.

CHUCKS, Drill

Chicago Tool & Engineering Co., 839 So. Chicago Ave., Chicago, Ill.
Etco Tool Co., Inc., 592 Johnson Ave., Brooklyn, N. Y.
Jacobs Mfg. Co., West Hartford, Conn.
Orban Kurt & Co., Inc., 205 E. 42nd St., New York 17, N. Y.
Scully-Jones & Co., 1903 Rockwell St., Chicago 8, Ill.
Skinner Chuck Co., 344 Church St., New Britain, Conn.
Whitman & Barnes, 40600 Plymouth Rd., Plymouth, Mich.

CHUCKS, Full Floating

Errington Mechanical Laboratory, 24 Norwood Ave., Stapleton, Staten Island, N. Y.
Gisholt Mch. Co., Madison 10, Wis.
Scully-Jones & Co., 1903 Rockwell St., Chicago 8, Ill.
Universal Engineering Co., Frankenthuth 2, Mich.

(Continued on page 444)

LOOK FOR Turchan

AT THE
**CHICAGO
MACHINE TOOL
SHOW**

**HYDRAULIC
TRACER CONTROLS**

**MACHINE MANUFACTURERS SHOWING
TURCHAN TRACER EQUIPPED MACHINES
AT CHICAGO TOOL SHOW**

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|-----------------------------|---|-----------|
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| Axelson Manufacturing Co. | Three-Dimension Pencil Tracer on a 1½ V Milling Machine | |
| Cincinnati Shaper Company | Tracer Controls on a 24" Shaper | 1105 |
| Ohio Machine Tool Company | Hydro-Feed Automatic Production Lathe | 301 |
| Portage Machine Company | Die Profiling Attachment on a 4" Profiling Horizontal Boring Mill | |
| Seneca Falls Machine Co. | Lo-Swing Automatic Production Lathe | |
| George Gordon Co. | 9-J Vertical Milling Machine | |



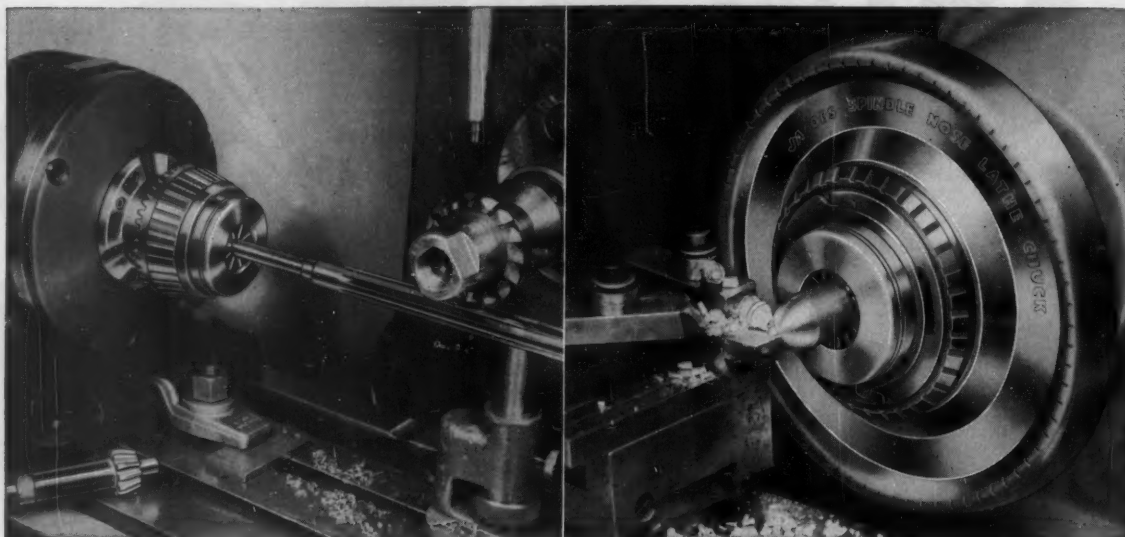
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TURCHAN FOLLOWER MACHINE COMPANY

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PIONEER AND LEADER IN HYDRAULIC TRACER CONTROLS SINCE 1933

See these **JACOBS**



The Jacobs Model 96 Rubber-Flex® Collet Chuck is the most accurate collet chuck in the world with a grip unmatched by any split steel collets. Here Model 96 holds stock milled with precisely spaced splines.

The Jacobs Model 91 Spindle Nose Lathe Chuck delivers from two to four times more torque than any split steel collet chuck and costs less than half as much on a complete-with-collets basis.

At the **JACOBS**

IN THE PRODUCTION ENGINEERING SHOW

SEPTEMBER 6th

Jacobs and your local distributor
are ready to deliver the chucks you need
and the service you deserve.

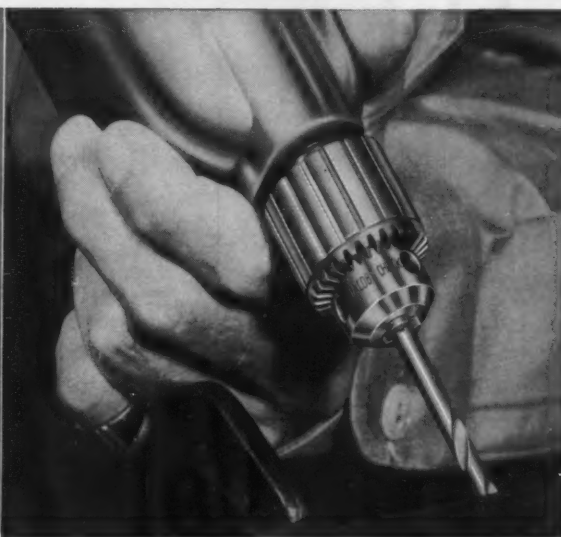
first in chucks . . . first in service

JACOBS MANUFACTURING COMPANY

CHUCKS *perform*



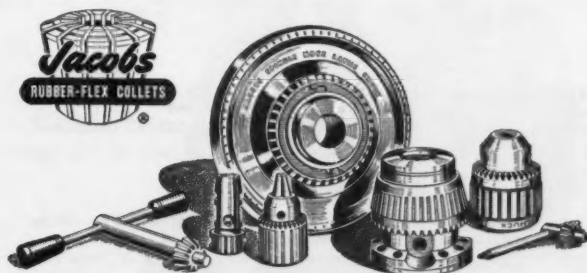
The Jacobs Ball Bearing Super Chuck is a heavy duty chuck for heavy duty drilling . . . it's a bear for grip and 100% more powerful than comparable plain bearing chucks.



The Plain Bearing Jacobs Chuck is undoubtedly the best known chuck in the world . . . and with good reasons, reasons like its precision accuracy, durability and tremendous gripping power.

EXHIBIT

BOOTHS 104 and 105 - NAVY PIER, CHICAGO
THROUGH 16th



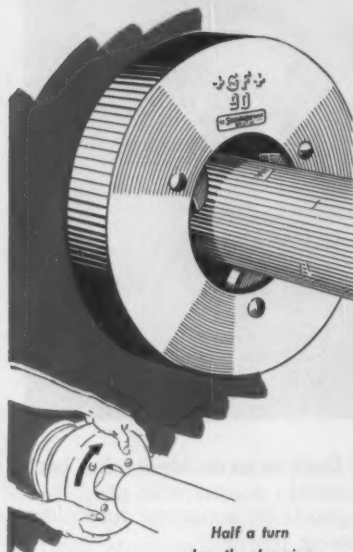
Jacobs
CHUCKS
If it's a Jacobs - it holds

WEST HARTFORD 10, CONNECTICUT

For more information on products advertised, use Inquiry Card, page 325

MACHINERY, September, 1955—443

SKINNER +GF+ WORK DRIVERS



- FAST
- SAFE
- POWERFUL
- EASY TO OPERATE

The Best for Turning on Centers
+GF+ Work Drivers drive smooth or rough bars and forgings located on centers. Jaws are easily reversed to accommodate direction of spindle rotation.

NOTE WIDE RANGES!

| | | |
|----------|-------|---------------------|
| Type 36 | ..... | 1/4" to 1 1/16" |
| Type 60 | ..... | 5/16" to 2 3/8" |
| Type 90 | ..... | 1/2" to 3 1/16" |
| Type 140 | ..... | 1 1/16" to 5 1/2" |
| Type 200 | ..... | 4 15/16" to 8 1/16" |

Write Skinner or your nearest Skinner distributor for illustrated folder.

THE CREST  OF QUALITY

THE **SKINNER**
CHUCK COMPANY

206 Edgewood Avenue, New Britain, Conn.

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Woodworth, N. A., Co., 1300 E. Nine Mile Rd., Detroit 20, Mich.

CHUCKS, Lathes, etc.

Axelson Mfg. Co., 6160 S. Boyle Ave., Los Angeles 58, Cal.
Bullard Co., Brewster St., Bridgeport 2, Conn.
Chicago Tool & Engineering Co., Milling Machine, 839 So. Chicago Ave., Chicago, Ill.
Cushman Chuck Co., Windsor Ave., Hartford 2, Conn.
Gisholt Mch. Co., Madison 10, Wis.
Jacobs Mfg. Co., West Hartford, Conn.
Jones & Lamson Mch. Co., Springfield, Vt.
Rivett Lathe & Grinder, Inc., Brighton, Boston 35, Mass.
Scherr, George Co., Inc., 200 Lafayette St., New York 12, N. Y.
Skinner Chuck Co., 344 Church St., New Britain, Conn.
South Bend Lathe Works, Inc., 425 E. Madison St., South Bend, Ind.
Standard Tool Co., 3950 Chester Ave., Cleveland, Ohio.
Warner & Swasey Co., 5701 Carnegie Ave., Cleveland 3, Ohio.
Zagar Tool, Inc., 24000 Lakeland Blvd., Cleveland 23, Ohio.

CHUCKS, Magnetic

Brown & Sharpe Mfg. Co., Providence, R. I.
DoAll Co., 254 Laurel Ave., Des Plaines, Ill.
Hanchett Magna-Lock Corp., Big Rapids, Mich.
Taft-Peirce Mfg. Co., Woonsocket, R. I.
Walker, O. S., Co., Inc., Worcester, Mass.

CHUCKS, Power Operated

Skinner Chuck Co., 344 Church St., New Britain, Conn.

CHUCKS, Quick Change and Safety

Chicago Tool & Engineering Co., 839 So. Chicago Ave., Chicago, Ill.
Errington Mechanical Laboratory, 24 Norwood Ave., Stapleton, S. I., N. Y.
Scully-Jones & Co., 1903 Rockwell St., Chicago 8, Ill.
Universal Engineering Co., Frankenmuth 2, Mich.

CHUCKS, Ring Wheel

Gardner Mch. Co., 414 E. Gardner St., Beloit, Wis.

CHUCKS, Tapping

DoAll Co., 254 N. Laurel Ave., Des Plaines, Ill.
Errington Mechanical Laboratory, 24 Norwood Ave., Stapleton, S. I., N. Y.
Jacobs Mfg. Co., West Hartford, Conn.
Jarvis Corp., Middletown, Conn.
Scully-Jones & Co., 1903 Rockwell St., Chicago 8, Ill.
Skinner Chuck Co., 344 Church St., New Britain, Conn.

CIRCUIT-BREAKERS

General Electric Co., Schenectady 5, N. Y.
Westinghouse Electric Corp., E. Pittsburgh, Pa.

CLAMPING APPLIANCES, Machine Tools

Standard Shop Equipment Co., Inc., 8299 W. Tincum Ave., Philadelphia, Pa.

CLAMPS

Armstrong Bros. Tool Co., 5200 W. Armstrong Ave., Chicago, Ill.
Brown & Sharpe Mfg. Co., Providence, R. I.
Danly Mch. Specialties, Inc., 2107 S. 52nd Ave., Chicago 50, Ill.
Lufkin Rule Co., Hess Ave., Saginaw, Mich.
Mead Specialties Co., 4114 N. Knox Ave., Chicago 41, Ill.
Precision Tool & Mfg. Co., 1305 S. Laramie, Cicero 50, Ill.
Rivett Lathe & Grinder, Inc., Brighton, Boston 35, Mass.

Standard Shop Equipment Co., Inc., 8299 W. Tincum Ave., Philadelphia, Pa.
Starrett, The L. S., Co., Athol, Mass.
Williams, J. H. & Co., 400 Vulcan St., Buffalo 7, N. Y.

CLEANERS, Chemical, for Metal

Bullard Co., Bullard-Dunn Process Div., Brewster St., Bridgeport 2, Conn.
Oakite Products, Inc., 19 Rector St., New York, N. Y.
Parker Rust Proof Co., 2194 E. Milwaukee, Detroit 11, Mich.

CLUTCHES

Clearing Mch. Corp., Div. U. S. Industries, Inc., 6499 W. 65th St., Chicago, Ill.
Farrel-Birmingham Co., Inc., 25 Main St., Ansonia, Conn.
Federal Machine & Welder Co., Overland Ave., Warren, Ohio
Lipe-Railway Corp., 806 Emerson Ave., Syracuse, N. Y.
Rockford Clutch Div., Borg-Warner Corp., 410 Catherine St., Rockford, Ill.
Twin Disc Clutch Co., 1361 Racine St., Racine, Wis.
Verson Allsteel Press Co., 93rd St. & S. Kenwood Ave., Chicago, Ill.

COLLARS, Safety

Standard Pressed Steel Co., Jenkintown, Pa.

COLLETS

Axelson Mfg. Co., 6160 S. Boyle Ave., Los Angeles 58, Cal.
Brown & Sharpe Mfg. Co., Providence, R. I.
Chicago Tool & Engineering Co., 839 So. Chicago Ave., Chicago, Ill.
Cincinnati Milling Machine Co., Oakley, Cincinnati, Ohio.
Cleveland Automatic Machine Co., 4932 Beech St., Cincinnati 12, Ohio.
DoAll Co., 254 N. Laurel Ave., Des Plaines, Ill.
Gisholt Mch. Co., 1245 E. Washington Ave., Madison 10, Wis.
Gleason Works, 1000 University Ave., Rochester 3, N. Y.
Hardinge Bros., Inc., 1418 College Ave., Elmira, N. Y.
New Britain Mch. Co., New Britain-Bridley Mch. Div., New Britain, Conn.
Pratt & Whitney, West Hartford 1, Conn.
Rivett Lathe & Grinder, Inc., Brighton, Boston 35, Mass.
Scully-Jones & Co., 1903 Rockwell St., Chicago 8, Ill.
South Bend Lathe Works, Inc., 425 E. Madison St., South Bend, Ind.
Tomkins-Johnson Co., Jackson, Mich.
Union Twist Drill Co., Athol, Mass.
Universal Engrg. Co., Frankenmuth 2, Mich.
Zagar Tool, Inc., 24000 Lakeland Blvd., Cleveland 23, Ohio.

COMPARATORS

See Gages, Comparator.

COMPARATORS, Optical

DoAll Co., 254 Laurel Ave., Des Plaines, Ill.
Eastman Kodak Co., Rochester, N. Y.
Jones & Lamson Mch. Co., Springfield, Vt.
Scherr, George Co., Inc., 200 Lafayette St., New York 12, N. Y.

COMPOUNDS, Cleaning

Houghton, E. F., & Co., 303 W. Lehigh Ave., Philadelphia, Pa.
Oakite Products, Inc., 19 Rector St., New York

COMPOUNDS, Cutting, Grinding, Metal Drawing, Etc.

Cities Service Oil Co., 70 Pine St., New York, N. Y.
Houghton, E. F., & Co., 303 W. Lehigh Ave., Philadelphia, Pa.
National Broach & Mch. Co., 5600 St. Jean Ave., Detroit 2, Mich. (Broaching & Lapping).

(Continued on page 450)

8 PRECISION GEARS

...all generated on a single Farrel-Sykes machine

Those eight gears should give you some idea of the versatility of a Farrel-Sykes "Twin-Head" generator.

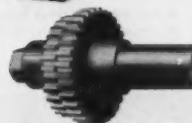
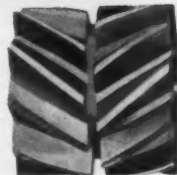
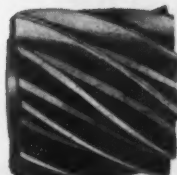
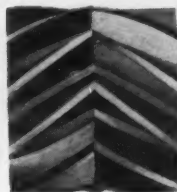
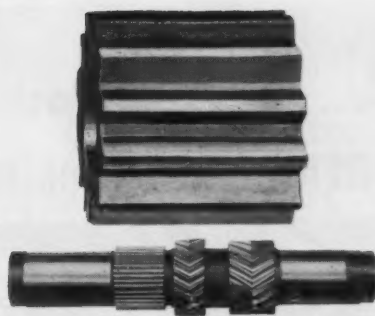
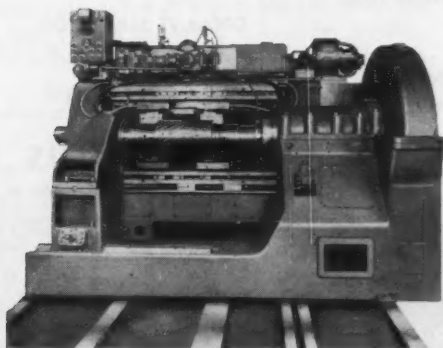
The gear machine is made with the work axis horizontal, the position in which the gears themselves run. This permits a wide variety of work to be handled on a single generator—controls the work positively, too.

Built with high initial precision, "Twin-Head" generators are provided with means of compensating for wear and sustaining accuracy for thousands of operating-hours. Other important benefits are faster cutting speed, reduced setup time, and ease of operation.

Write for details of this versatile gear generator, today.

FARREL-BIRMINGHAM COMPANY, INC.
ANSONIA, CONNECTICUT

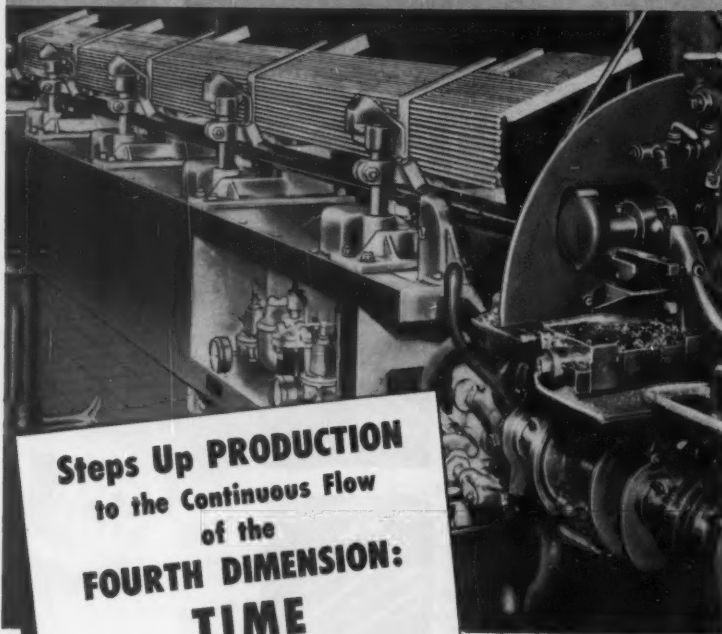
Plants: Ansonia and Derby, Conn., Buffalo and Rochester, N. Y.
Sales Offices: Ansonia, Buffalo, New York, Cambridge (Mass.), Akron, Cleveland, Chicago, Los Angeles, Houston



Types of gears illustrated (from top to bottom): spur • gear component with integral shaft • continuous-tooth herringbone • single helical • double helical with staggered teeth • double helical, staggered-tooth, with center groove • herringbone rack and pinion • cluster.

Farrel-Birmingham®

Now... A Screw-Machine-Feed that BREAKS THE TIME BARRIER!



**Steps Up PRODUCTION
to the Continuous Flow
of the
FOURTH DIMENSION:
TIME**

EVERY TIME a screw machine cuts air...every time feed fingers are adjusted or replaced...every time remnant removal forces a shut-down — *that's time lost forever, never again to be made up in the production quota!*

In the modern Lipe Automatic Magazine-Loading Bar Feed, we present a continuous-feed mechanism that utilizes *every minute* of the working day for production...and still more production.

There's No cutting air. No feed fingers. No remnant problem. No minimum or maximum run. No limit on length of feed. No selective stock length requirement.

There is a definite increase in production — up to 100% on some installations — at least 30% on every one!



Send today for **FREE BOOKLET** giving full details on Lipe's AML Bar Feed — today's big advancement in screw machine stock feeding. We will also supply name of your nearest distributor.



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Parker Rust Proof Co., 2194 E. Milwaukee, Detroit 11, Mich.
Shell Oil Co., 50 W. 50th St., New York, N. Y.
Sinclair Refining Co., 600 Fifth Ave., New York.
Standard Oil Co., (Indiana), 910 S. Michigan, Chicago, Ill.
Stuart, D. A., Oil Co., Ltd., 2739 S. Troy St., Chicago 23, Ill.
Sun Oil Co., 1608 Walnut St., Philadelphia, Pa.
Texas Co., 135 E. 42nd St., New York, N. Y.
White & Bagley Co., Worcester, Mass.

COMPOUNDS, Resin and Molding

General Electric Co., Schenectady 5, N. Y.

COMPRESSORS, Air

Chicago Pneumatic Tool Co., 6 E. 44th St., New York, N. Y.
Ingersoll-Rand Co., Phillipsburg, N. J.

CONTOUR FOLLOWER

Axelson Mfg. Co., 6160 S. Boyle Ave., Los Angeles 58, Cal.
Turchan Follower Machine Co., 8259 Livorno and Alaska Aves., Detroit, Mich.

CONTRACT WORK

Axelson Mfg. Co., 6160 S. Boyle Ave., Los Angeles 58, Cal.
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Dieffendorf Gear Corp., 920 N. Belden Ave., Syracuse, N. Y.
Eisler Engrg. Co., 760 S. 13th, Newark 3, N. J.
Erie Foundry Co., Erie, Pa.
Federal Machine & Welder Co., Overland Ave., Warren, Ohio.
Fellows Gear Shaper Co., Springfield, Vt.
Hartford Special Machry. Co., 287 Homestead Ave., Hartford, Conn.
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W. B. Knight Machine Co., St. Louis, Mo.
Lees-Bradner Co., Cleveland, Ohio.
Minster Machine Co., Minster, Ohio.
Morse Twist Drill & Mch. Co., New Bedford, Mass.
Mummert-Dixon Co., Hanover, Pa.
National Acme Co., 170 E. 131st St., Cleveland, Ohio.
Rivett Lathe & Grinder, Inc., Brighton, Boston 35, Mass.
Rockford Mch. Tool Co., 250 Kishwaukee St., Rockford, Ill.
Sheffield Corp., 721 Springfield St., Dayton 1, Ohio.
U. S. Tool Co., Inc., 255 North 18th St., Ampere, N. J.
Verson Allsteel Press Co., 93rd St. & S. Kenwood Ave., Chicago, Ill.
Wicaco Mch. Corp., Wayne Junction, Philadelphia, Pa.

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Clark Controller Co., Cleveland, Ohio.
General Electric Co., Schenectady 5, N. Y.
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Barnes Drill Co., 814 Chestnut St., Rockford, Ill.

COOLANT SEPARATORS

See Separators, Oil or Coolant

COOLANT SYSTEMS

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COUNTERBORES

Allen Mfg. Co., 133 Sheldon St., Hartford 2, Conn.
Carbolay Dept., General Electric Co., Box 237, Roosevelt Park Annex, Detroit 32, Mich.
Chicago-Latrobe Twist Drill Works, 411 W. Ontario St., Chicago, Ill.
Cleveland Twist Drill Co., 1242 E. 49th St., Cleveland, Ohio.
DoAll Co., 254 N. Laurel Ave., Des Plaines, Ill.
Eclipse Counterbore Co., 1600 Bonner Ave., Ferndale, Mich.
Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit 32, Mich.
Firth Sterling, Inc., 3113 Forbes St., Pittsburgh 30, Pa.

(Continued on page 450)

ZIEGLER

Floating Tool Holders

FOR TAPPING, REAMING, ETC.

*Automatically Compensate
for Misalignment*

On thousands of tapping, reaming and various other operations, the Ziegler Floating Tool Holder has demonstrated its value to users by SPEEDING UP THE JOB of aligning the work with the spindle.

With the Ziegler Floating Tool Holder, perfect spindle alignment is not necessary to obtain perfect cutting-tool and work alignment. The Tool Holder AUTOMATICALLY COMPENSATES for the inaccuracy.

Another advantage of better alignment is longer cutting-tool life, more work between sharpenings and less down-time for changing tools. The Ziegler Floating Tool Holder is time-saving in solving the problem of oversize and bell-mouth holes, resulting in reduced spoilage losses. These add up to SUBSTANTIAL SAVINGS.

Better results are had on ALL misalignment applications by using Ziegler Floating Tool Holders.

MADE TO FIT ANY MACHINE

Furnished with male or female tapers, straight, threaded or special shanks to fit any machine used for tapping, reaming, counterboring, spot facing and similar operations.

PROMPT DELIVERY

W. M. ZIEGLER TOOL COMPANY,

13570 AUBURN, DETROIT 23, MICH.

Largest

**EXCLUSIVE MANUFACTURER
OF FLOATING TOOL HOLDERS**



Radically *NEW* Concepts

New "Series A" Automatic Drilling and Tapping Machines

New automatic cycle—rapid approach—feed—rapid return through simplified electro-mechanical design.

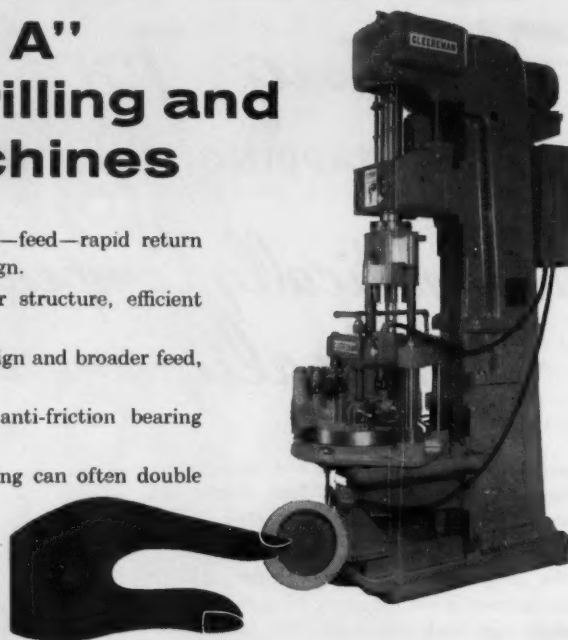
New rigidity and power from heavier structure, efficient drive and higher horsepower.

New applications through universal design and broader feed, speed and tap lead ranges.

New lubrication facility with 100% anti-friction bearing design—lower operating costs.

New approaches with simplified fixturing can often double or triple output.

**DRILLS AND TAPS HOLES AT
THE TOUCH OF A BUTTON**



Sliding Head Drilling Machines

**BOX COLUMN AND ROUND COLUMN
FOR LOW OPERATING COST**



New rigidity in really quick change multi-speed, multi-feed Upright Sliding Head Drilling Machines.

New stiffer, heavier spindle for longer life and higher production.

New faster set-up facility for easier operation and less idle time.

New involute spline drive throughout for increased capacity and lower maintenance.

New accessories for broader application and increased efficiency.

by **CLEEREMAN**

Booth 1007

**THE
MACHINE TOOL
SHOW**

CHICAGO, ILL.
SEPT. 6-17, 1955
INTERNATIONAL AMPHITHEATRE



New Precision Jig Borer



New structural concepts give 100% support to heavy work throughout entire range of machine.

New automatic ultra-precision positioning eliminates manual operation of table and saddle elements.

New guide design insures longer, more precise alignments of table and saddle.

New spindle nose tooling gives faster handling and higher efficiency.

—A new procedure for tool room or production work with increased output, precision and profit.

Layout Drilling Machine

A MODERN SOLUTION TO AN OLD PROBLEM

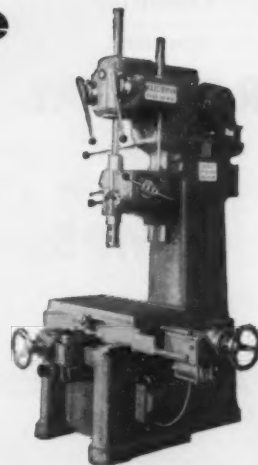
New approach to tool room and production layout work not requiring the ultra-precision of the Cleereman Jig Borer

New increased output through easier operation and control.

New efficiency with new spindle nose tooling.

New rigidity with improved structure and increased drive capacity.

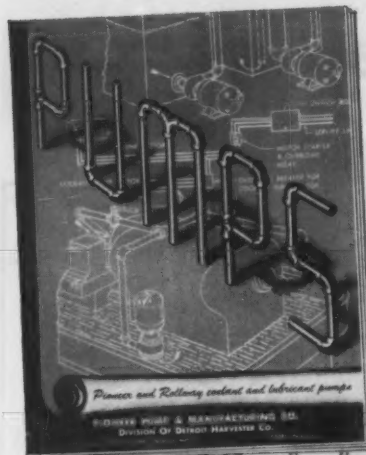
New longer precision life with improved design of elements.



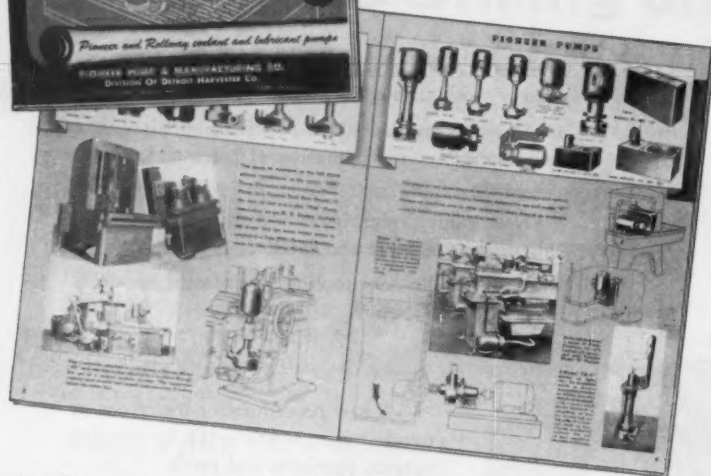
General Office
640 West Washington Blvd., Chicago 6
Representatives in Principal Cities

AFFILIATED WITH

CLEEREMAN MACHINE TOOL CO., Green Bay, Wis.
BUILDERS OF PRECISION JIG BORERS AND DRILLING MACHINES



Get Your Free Copy of this **PUMP BOOKLET**



It Gives You Basic Information on

PIONEER Centrifugal and **ROLLWAY** Positive Displacement **PUMPS**

for Coolants,
Lubricants, and
Abrasive Liquids

Send for
Your Copy

An introduction to Pioneer's complete line of 400 models—developed through 23 years as a specialist in Centrifugal and Positive Displacement pumps. Illustrated are some 40 Pioneer and Rollway models, together with numerous application pictures and a description of the features of basic pump types.

Pioneer pumps offer manufacturers many advantages, including the saving effected through the selection of standard pumps to meet custom requirements—plus an unusual opportunity for standardization and interchangeability.

Pioneer application engineers will welcome the opportunity to discuss your pump requirements with you.

PIONEER PUMP DIVISION
DETROIT HARVESTER COMPANY

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Detroit 9, Michigan

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Kennametal, Inc., Latrobe, Pa.
National Twist Drill & Tool Co., Rochester, Mich.
Pratt & Whitney, West Hartford 1, Conn.
Scully-Jones & Co., 1903 Rockwell St., Chicago 8, Ill.
Starrett, The L. S., Co., Athol, Mass.
Super Tool Co., 21650 Hoover Rd., Detroit 13, Mich.
Threadwell Tap & Die Co., Greenfield, Mass.
Union Twist Drill Co., Athol, Mass.
Whitman & Barnes, 40600 Plymouth Rd., Plymouth, Mich.
Willey's Carbide Tool Co., 1340 W. Vernor Hwy., Detroit 1, Mich.

COUNTERSHAFTS

Standard Pressed Steel Co., Jenkintown, Pa.

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Chicago-Latrobe Twist Drill Works, 411 W. Ontario St., Chicago, Ill.
Circular Tool Co., Inc., 765 Allens Ave., Providence 5, R. I.
Cleveland Twist Drill Co., 1242 E. 49th St., Cleveland, Ohio.
Dr-Alt Co., 254 N. Laurel Ave., Des Plaines, Ill.
Eclipse Counterbore Co., 1600 Bonner Ave., Ferndale, Mich.
Ex-Cell-O Corp., 120 Oakman Blvd., Detroit 32, Mich.
Gairing Tool Co., 21225 Hoover Rd., Detroit 32, Mich.
Greenfield Tap & Die Corp., Greenfield, Mass.
Haynes Stellite Div., Union Carbide & Carbon Corp., 30 E. 42nd St., New York.
Jarvis Corp., Middletown, Conn.
National Twist Drill & Tool Co., Rochester, Mich.
Scully-Jones & Co., 1903 Rockwell St., Chicago 8, Ill.
Super Tool Co., 21650 Hoover Rd., Detroit 13, Mich.
Union Twist Drill Co., Athol, Mass.

COUNTERS, Revolution

Brown & Sharpe Mfg. Co., Providence, R. I.
Mullers Falls Co., Greenfield, Mass.
Starrett, The L. S., Co., Athol, Mass.

COUNTING DEVICES

Starrett, The L. S., Co., Athol, Mass.

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Cone-Drive Gear Div., Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich.
Farrel-Birmingham Co., Inc., 25 Main St., Ansonia, Conn.
Philadelphia Gear Works, Erie Ave., and G St., Philadelphia, Pa.
Sier-Bath Gear & Pump Co., Inc., 9248 Hudson Blvd., North Bergen, N. J.
Westinghouse Electric Corp., E. Pittsburgh, Pa.

COUPLINGS, Shaft

Boston Gear Works, 3200 Main St., North Quincy, Mass.
Cone-Drive Gear Div., Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich.
Sier-Bath & Pump Co., Inc., 9248 Hudson Blvd., North Bergen, N. J.
Standard Pressed Steel Co., Jenkintown, Pa.

CRANES, Electric Traveling

Cleveland Crane & Engrg. Co., Wickliffe, Ohio.

CUTTER GRINDERS

See Grinding Machines, for Sharpening Cutters, Reamers, Hobs, Etc.

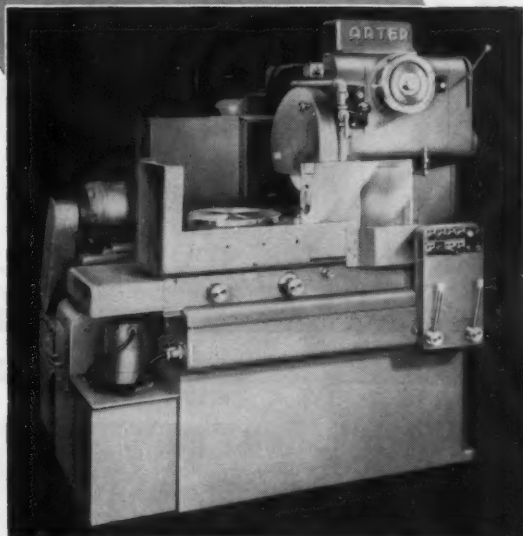
(Continued on page 454)

ARTER**FAMILY OF GRINDERS**

at the

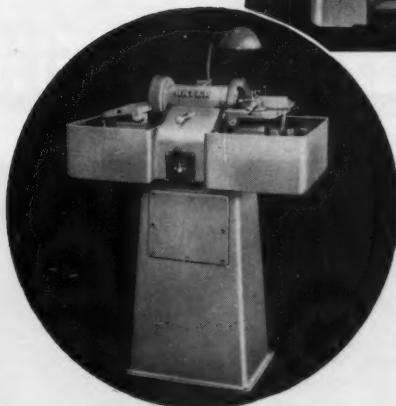
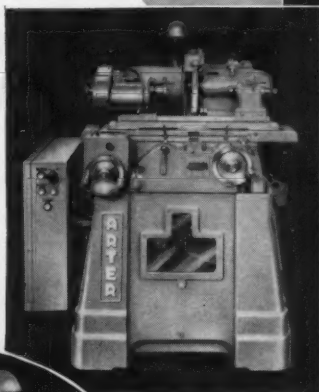
MACHINE TOOL SHOW**Sept. 6-17 • Booth 1308**

A GENERATION of experience stands behind the ARTER family of grinding machines. Progressively these machines have attained advanced techniques, simplification of grinding processes, closer tolerances. Today ARTER is proud of the family including the newest members, Models E and F Rotary Surface Grinders, making their bows at the Tool Show.

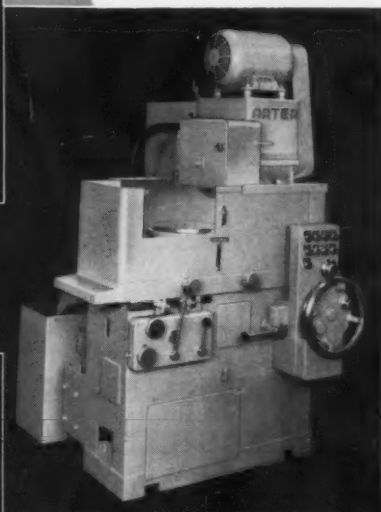


MODEL E—12" AND 16"
ROTARY SURFACE GRINDER

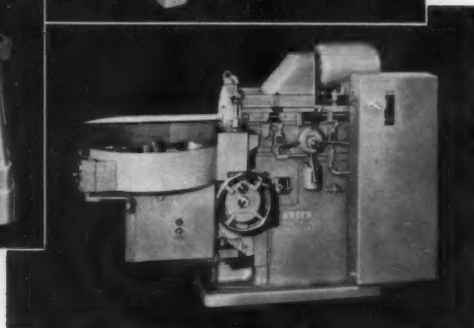
MODEL 103—
CYLINDRICAL AND
INTERNAL GRINDER



MODEL 200
CARBIDE TOOL GRINDER



MODEL F 12"
ROTARY SURFACE
GRINDER

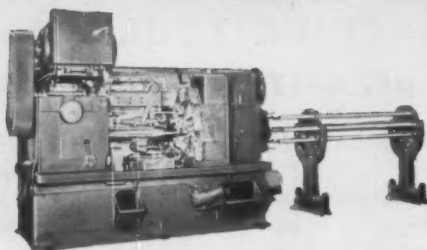


MODEL D—SPECIAL
SEMI-AUTOMATIC
ROTARY SURFACE
GRINDER
ARRANGED WITH
WORK-LOADING
AND PUSH BUTTON
GRINDER CYCLE

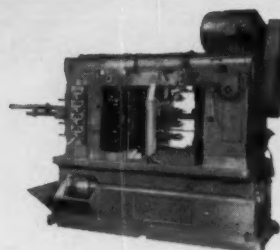
ARTER GRINDING MACHINE CO.
WORCESTER • MASSACHUSETTS

Agents in industrial centers of United States and Canada

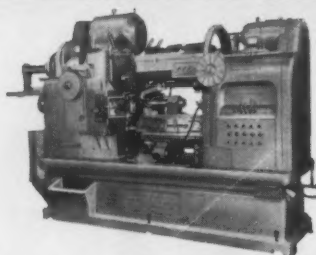
Conomatic



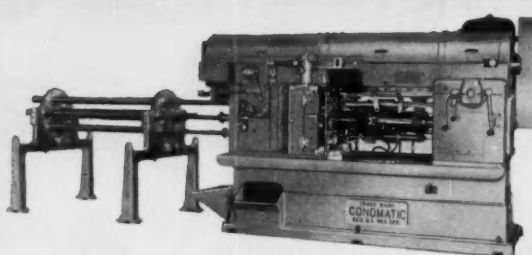
1" TS) and 1½" (TF) - 6-Spindle Conomatics Feature High Speeds and Fast Change-over



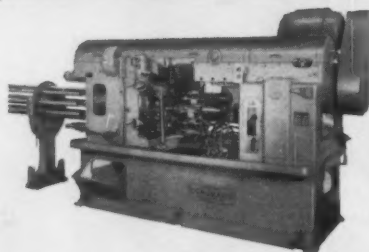
4-Spindle Non-Indexing Conomatics Feature Maximum Yield on Forming, Chamfering, and Cutting-off Operations



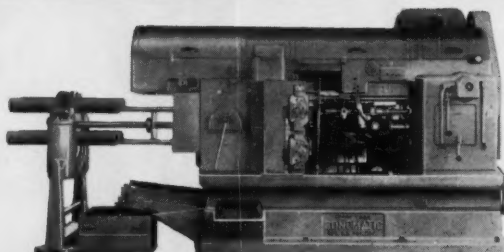
Single Spindle Conomatic Bar machine is available in the 3½", 5" and 6" sizes. Its frame is an innovation in the field of single spindle automatics



6-Spindle Bar Machines are Available in 11 Models from 1" to 4" Inclusive



1½", 1¾", 1½", 2¼", 2½" and 3" - 6-Spindle Conomatics Feature Maximum Work Handling Capacity



2½" LA, 3¼" AD, 5" KL & 5¼" KR 4-Spindle Conomatics Feature Fast Change-over and Speeds for Carbide Tools

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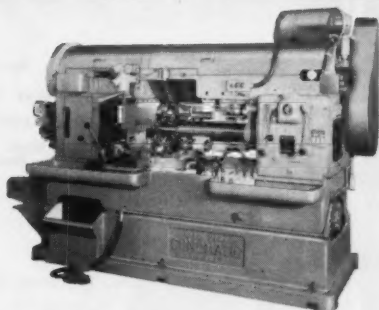
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Gilbert Lodge & Company Limited
240 Hay Street
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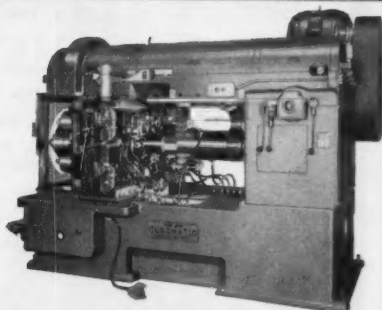
Automatic Lathes

Bar & Chucking Machines

1, 4, 6 and 8 SPINDLES ... 61 MODELS



5 1/2" 6 Conomatic Chucker Model SV. Adequate range and Selectivity of Work-Spindle Speeds and Tool Feeds, to Accomplish Maximum Machineability



9 1/4" 6 Conomatic Chucker Model TJ. Substantial Support (Frame Construction, etc.) to all Tools & Work, and Other Functioning Units

A machine not put to its best use is theoretically idle. Proper machine selection is an important factor in the profitable use of a multiple spindle automatic. So extensive are the demands on this type of lathe that no single model—or number of models—can be expected to efficiently handle the wide range of work available.

To excel in any range of work a multiple spindle automatic must be specifically designed for that range. That is why CONOMATICS are provided in so many models. In no other way can the purchaser be assured of the best possible machine for his particular requirements.

There are 61 available models of CONOMATICS.



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Pombosa S. A.
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International Machinery Company
Calle 1073, Santiago, Chile
International Machinery Company
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COLOMBIA

Assafael Services, Inc.
Oficina Técnica para Colombia
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Medellín, Colombia

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Avenida Potosí 3311
Mexico D. F., Mexico

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Rotterdam, N.L., Holland
Argental del Sur, S. A.
Avenida Potosí 1234
Rotterdam, N.L., Holland

International Machinery Company
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SEPTEMBER 6-17

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index table

NEW Multi-spindle production
drill-tapper

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Series F Cleveland automatic
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C

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Mich.
Fellows Gear Shaper Co., 78 River St., Spring-
field, Vt.
Gleason Works, 1000 University Ave., Roches-
ter 3, N. Y.
Michigan Tool Co., 7171 E. McNichols Rd.,
Detroit 12, Mich.
National Broach & Mch. Co., 5600 St. Jean
Ave., Detroit 2, Mich. (Shaving).
National Twist Drill & Tl. Co., Rochester, Mich.
Pratt & Whitney, West Hartford 1, Conn.
Union Twist Drill Co., Athol, Mass.
Waltham Mch. Wks., Newton St., Waltham,
Mass.
Wesson Co., 1220 Woodward Heights Blvd.,
Ferndale, Mich.

CUTTERS, Keyseater

Davis Keyseater Co., 405 Exchange St., Roch-
ester 8, N. Y.
DoAll Co., 254 N. Laurel Ave., Des Plaines, Ill.
du Mont Corp., Greenfield, Mass.
Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit
32, Mich.
Threadwell Tap & Die Co., Greenfield, Mass.
Wesson Co., 1220 Woodward Heights Blvd.,
Ferndale, Mich.

CUTTERS, Milling

Apex Tool & Cutter Co., Inc., 237 Canal St.,
Shelton, Conn.
Barber-Colman Co., Rock St., Rockford, Ill.
Brown & Sharpe Mfg. Co., Providence, R. I.
Carboloy Dept., General Electric Co., Box 237,
Roosevelt Park Annex, Detroit 32, Mich.
Cleveland Twist Drill Co., 1242 E. 49th St.,
Cleveland, Ohio.
Detroit Tap & Tool Co., 8615 E. 8 Mile Rd.,
Base Line, Mich. (Thread).
DoAll Co., 254 N. Laurel Ave., Des Plaines, Ill.
Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit
32, Mich.
Firth Sterling Inc., 3113 Forbes St., Pitts-
burgh 30, Pa.
Gairing Tool Co., 21225 Hoover Rd., Detroit
32, Mich.
Gorton, George, Mch. Co., 1110 W. 13th St.,
Racine, Wis.
Haynes Stellite Div., Union Carbide & Carbon
Corp., 30 E. 42nd St., New York, N. Y.
Ingersoll Milling Mch. Co., 2442 Douglas St.,
Rockford, Ill.
Kearney & Trecker Corp., Milwaukee, Wis.
Kennametal, Inc., Latrobe, Pa.
Match & Merryweather Mchry. Co., Penton
Bldg., Cleveland, Ohio.
National Twist Drill & Tl. Co., Rochester, Mich.
Onsrud Machine Works, Inc., 3940 Palmer St.,
Chicago, Ill.
Pratt & Whitney, West Hartford 1, Conn.
Scully-Jones & Co., 1903 Rockwell St., Chi-
cago 8, Ill.
Sonnott Tool & Mfg. Co., Hawthorne, Cal.
Super Tool Co., 21650 Hoover Rd., Detroit 13,
Mich.
Tomkins-Johnson Co., Jackson, Mich.
Union Twist Co., Athol, Mass.
Wesson Co., 1220 Woodward Heights Blvd.,
Ferndale, Mich.
Wiley's Carbide Tool Co., 1340 W. Vernor
Hwy., Detroit 1, Mich.

CUTTERS, Rotary

See Files & Burrs Rotary

CUTTING COMPOUNDS

See Compounds, Cutting, grinding,
Etc.

CUTTING AND GRINDING FLUIDS

Cincinnati Milling Products Div., Cincinnati
Milling Machine Co., Cincinnati, Ohio.
Cimcoal Div., Cincinnati Milling Mch. Co.,
Cincinnati, Ohio.
Cities Service Oil Co., 70 Pine St., New York,
N. Y.
DoAll Co., 254 N. Laurel Ave., Des Plaines, Ill.
Houghton, E. F., & Co., 303 W. Lehigh Ave.,
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(Continued on page 456)

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it may help you solve a
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NF

PRODUCT EXAMPLES

CRANKSHAFT FOR DIESEL DRIVEN COMPRESSOR
GRINDING THE MAIN BEARINGS OF A 10,480 LB. 9 THROW CRANKSHAFT.

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The finished machines and component parts shown here are used in paper processing. National Forge has been producing these and other machines to customer specifications for the past ten years.

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Here are shafts for turbo (jet) engines and rotor shafts for helicopters; both require the maximum in strength and resistance to fatigue, wear and shock. Production starts with roughing, continues with five steps of heat treating, and ends with precision machining under metallurgical and

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This massive shaft is undergoing final inspection. National Forge has specialized in the production of diesel engines and electric steel rough machining. — all under the same roof — all under the same management.

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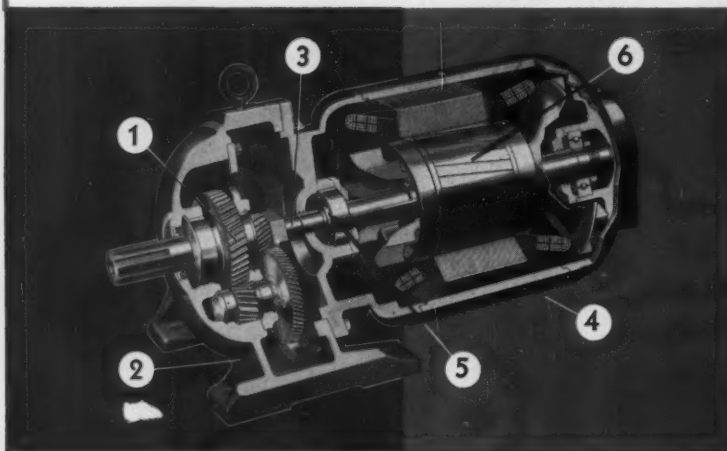
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to MACHINE BUILDERS, Howell suggests

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- 2. Compact, permanently aligned case.** Machine designers like the space-saving compactness of the Howell gear case. Pyramidal mounting puts support where it's needed—avoids the shaft misalignment possible when motor and gears have separate supports.
- 3. Rugged, solid-shank pinion.** Howell's pinion design, with threaded coupling and self-broaching splines, makes a failure-proof shaft connection between motor and gears. No troublesome keys.



- 4. NEMA-standard motors** give machine builders and users complete motor interchangeability, help them reduce inventories and simplify purchasing. Howell gearmotors give you this valuable feature—with the new re-rated motors included!
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Gearmotors Cut Costs. Actual savings achieved by Howell gearmotors over separate motor-plus-reducer-plus-coupling drives are available for your study. Just request "Gearmotor Savings Table" when you write for catalog.

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 Stuart, D. A., Oil Co., Ltd., 2739 S. Troy St., Chicago 23, Ill.
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 DoAll Co., 254 N. Laurel Ave., Des Plaines, Ill.
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 Landis Machine Co., Waynesboro, Pa., (Pipe).
 Modern Machine Tool Co., 601 S. Water St., Jackson, Mich. (Lathe Type for Tubing).

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 Hamilton Div., The Lodge & Shipley Co., Hamilton 1, Ohio.
 Wallace Tube Co., 1304-08 Diversey Pkwy., Chicago, Ill.
 Master Chemical Corp., 13 Huron St., Toledo 1, Ohio.

CUTTING-OFF MACHINES, Cold Saw

See Sewing Machines, Circular

CUTTING-OFF MACHINES, Metal Band Saws

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 DoAll Co., 254 N. Laurel Ave., Des Plaines, Ill.
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 Firth Sterling Inc., 3113 Forbes St., Pittsburgh 30, Pa.
 Haynes Stellite Div., Union Carbide & Carbon Corp., 30 E. 42nd St., New York, N. Y.
 Kennametal, Inc., Latrobe, Pa.
 Pratt & Whitney, West Hartford 1, Conn.
 Wesson Co., 1220 Woodward Heights Blvd., Ferndale, Mich.
 Whitman & Barnes, 40600 Plymouth Rd., Plymouth, Mich.
 Williams, J. H. & Co., 400 Vulcan St., Buffalo

CUTTING-OFF WHEELS, Abrasive

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 Norton Co., 1 New Bond St., Worcester, Mass.
 Simonds Abrasive Co., Tacony & Fraley Sts., Philadelphia 37, Pa.
 Smit, J. K. & Sons, Inc., Murray Hill, N. J.

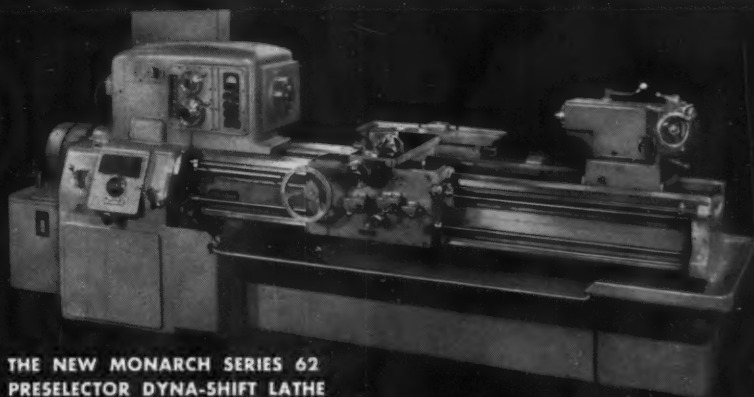
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 Consolidated Mch. Tool Corp., Rochester, N. Y.
 Cross Co., 3250 Bellevue Ave., Detroit 7, Mich.
 Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit 32, Mich.
 Ingersoll Milling Mch. Co., 2442 Douglas St., Rockford, Ill.
 Lempco Products, Inc., 5490 Dunham Rd., Bedford, Ohio.
 Moline Tool Co., 102 20th St., Moline, Ill.
 Snyder Tool & Engrg. Co., 3400 E. Lafayette, Detroit 7, Mich.

(Continued on page 458)

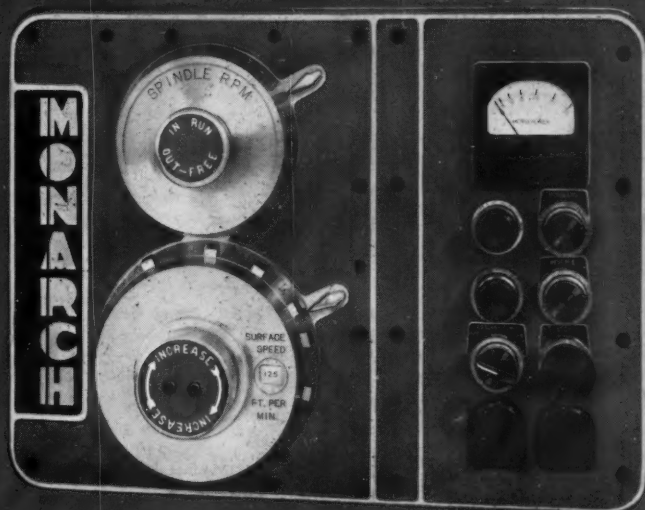
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See the New Monarch Series 62 Preselector Dyna-Shift—Unequaled for Speed and Ease



**THE NEW MONARCH SERIES 62
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Models 130 and 1130 (above)—13" swing over cross slide, 20" clearance diameter.
Models 131 and 1131—16" swing over cross slide, 24" clearance diameter.



Set it—forget it! That's the story of the Preselector Dyna-Shift. It's the brain Monarch has built into the new Series 62. With it *this* machine will give a greater ratio of metal removing hours to work hours than you ever dreamed possible.

When setting up, merely dial the surface speed wanted and the first diameter to be turned—the Dyna-Shift computes the R.P.M. and makes the shift instantaneously and automatically. (*Time-saver #1*). Then, to maintain this surface speed on successive diameters, set the work diameter selectors. Every speed change thereafter, on every piece in the run, takes place automatically with but one fast dial setting and movement of the work start and stop lever. (*Time-saver #2*). What's more, here at last is the lathe with a speed range so wide as to take care of all your needs. Its 20 H.P. drive gives you 36 different spindle speeds in a range from 14 to 1750 R.P.M., a ratio of 1 to 125. (*Time-saver #3*).

Nor are the time-saving features of the Series 62 limited to the Preselector Dyna-Shift headstock. There's four-way power rapid traverse which cuts tool positioning time 50% on the average. There's the totally enclosed and automatically lubricated gear box and end gearing. There's a completely new two speed tailstock. Add them all up—for a new lathe concept that means Production with a capital P!

You will want to know all about these and many other features in detail. Send the coupon for the greatest turning news in years ! ! . . . **The Monarch Machine Tool Company, Sidney, Ohio.**

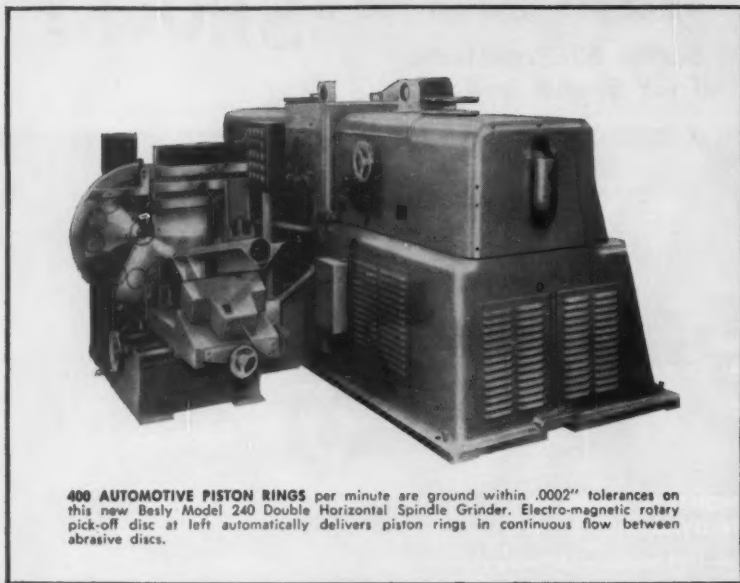


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Gentlemen:

- ☐ I am interested in your Series 62 story. Please send me your illustrated Booklet #1501 with complete data.
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400 AUTOMOTIVE PISTON RINGS per minute are ground within .0002" tolerances on this new Besly Model 240 Double Horizontal Spindle Grinder. Electro-magnetic rotary pick-off disc at left automatically delivers piston rings in continuous flow between abrasive discs.

BESLY Announces New High Precision, High Production Grinder

Grinds parallel surfaces within .0002" at rates
as high as 400 units per minute

The new model No. 240 Besly Double Horizontal Spindle Grinder was developed to meet today's increasing demands for greater accuracy and higher production. Grinding the parallel faces of piston rings is a natural job for the No. 240 Grinder. Automotive rings are being ground at the rate of 400 pieces per minute to .0002" for parallelism.

New in Design

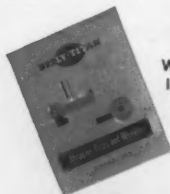
The Model 240 is an entirely new development in the Besly line of precision grinders. New features include automatic controls which are accessible from either side of the grinder. Even dressing each disc with its own separate dresser is push-button controlled. All controls, motors, starters and hydraulic units are enclosed within the rugged machine base.

Sealed Spindle Quill Construction

The grinder is equipped with Besly exclusive Sealed Spindle Quill construction which replaces old-fashioned ways with their problems of wear and inaccuracy. Quill construction also permits smooth, accurate adjustment of the abrasive discs and avoids transmitting motor vibration to the grinding spindle.

Fast Feed

High speed feeding is achieved through a simple electromagnetic pick-off disc which supplies work to the grinder in a continuous stream. Design of the machine has cut down-time for dressing, disc changing and set-up to one third of that required by other grinders.



NEW BULLETIN

Write for free copy of Bulletin 200 with description of complete Besly line of Double Horizontal Disc Grinders including the new 240.



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Tomkins-Johnson Co., Jackson, Mich.

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Hannafin Corp., 501 S. Wolf Rd., Des Plaines, Ill.
Hydraulic Press Mfg. Co., 300 Lincoln Ave., Mt. Gilead, Ohio.
Hydro-Line Mfg. Co., 5764 Pike Rd., Rockford, Ill.
Lehigh Foundries, Inc., 1500 Lehigh Dr., Easton, Pa.
Logansport Machine Co. Inc., 810 Center Ave., Logansport, Ind.
National Forge & Ordnance Co., Irvine, Warren County, Pa.
Oilgear Co., 1569 W. Pierce St., Milwaukee, Wis.
Rivett Lathe & Grinder, Inc., Brighton, Boston 35, Mass.
Rockford Machine Tool Co., 2500 Kiskadee St., Rockford, Ill.
Tomkins-Johnson Co., Jackson, Mich.
Turchan Follower Machine Co., 8259 Livernois & Alaska Aves., Detroit, Mich.

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Ryersen, Jos. T., & Son, Inc., 2558 W. 16th St., Chicago 18, Ill.
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Heald Mch. Co., 10 New Bond St., Worcester 6, Mass.
Luffin Rule Co., Hess Ave., Saginaw, Mich.
Tart-Pierce Mfg. Co., Woonsocket, R. I.
Walker, O. S. Inc., Worcester, Mass.

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Cross Co., 3250 Bellevue, Detroit 7, Mich.
Hartford Specialty Mchry. Co., 287 Homestead St., Hartford, Conn.
Millholland, W. K. Machinery Co., 6402 Westfield Blvd., Indianapolis 5, Ind.
Modern Ind. Engrg. Co., 14230 Birwood Ave., Detroit 4, Mich.
Pratt & Whitney, West Hartford 1, Conn.
Sheffield Corp., 721 Springfield St., Dayton 1, Ohio
Snyder Tool & Engrg. Co., 3400 E. Lafayette, Detroit 7, Mich.
Sundstrand Mch. Tool Co., 2531 11th St., Rockford, Ill.
Turchan Follower Machine Co., 8259 Livernois & Alaska Aves., Detroit, Mich.

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Precision Diamond Tool Co., 102 South Grove Ave., Elgin, Ill.
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See Castings, Die

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Hydraulic Press Mfg. Co., Mt. Gilead, Ohio.
Hydropress, Inc., 350 Fifth Ave., New York 1, N. Y.
Lake Erie Engineering Corp., Kenmore Station Buffalo, N. Y.

DIE CUSHIONS

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 Carboly Dept., General Electric Co., Box 237, 6499 W. 65th St., Chicago, Ill.
 Federal Machine & Welder Co., Overland Ave., Warren, Ohio.
 Verson Allsteel Press Co., 93rd St., and S. Kenwood Ave., Chicago, Ill.

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 Lemco Products, Inc., 5490 Dunham Rd., Bedford, Ohio.
 Producto Mch. Co., 990 Housatonic Ave., Bridgeport, Conn.
 U. S. Tool Co., Inc., 255 North 18th St., Ampere, N. J.

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 Cincinnati Milling Mach. Co., Oakley, Cincinnati 9, Ohio.
 Grab, Inc., Grafton, Wis.
 Kearney & Trecker Corp., Milwaukee, Wis.
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Bliss, E. W. Co., 1375 Raff Rd., S. W. Canton Ohio.
 Danly Mch. Specialties, Inc., 2107 S. 52nd Ave., Chicago 50, Ill.
 Lemco Products, Inc., 5490 Dunham Rd., Bedford, Ohio.
 Pratt & Whitney, West Hartford 1, Conn.
 Producto Mch. Co., 990 Housatonic Ave., Bridgeport, Conn.
 U. S. Tool Co., Inc., 225 N. 18th St., Ampere, N. J.
 Wales-Strippet Corp., North Tonawanda, N. Y.

DIE-SINKING MACHINES

Axelson Mfg. Co., 6160 S. Boyle Ave., Los Angeles 58, Cal.
 American Steel Foundries, Elmes Engrg. Div., Paddock Rd. and Tennessee Ave., Cincinnati, Ohio.
 Baldwin-Lima-Hamilton Corp., Eddystone Div., Philadelphia 42, Pa.
 Cincinnati Milling Mach. Co., Cincinnati, Ohio
 Grafton, George, Machine Co., 1110 W. 13th St., Racine, Wis.
 Orban, Kurt & Co., Inc., 205 E. 42nd St., New York 17, N. Y.
 Pratt & Whitney, West Hartford 1, Conn.
 Turchon Follower Machine Co., 8259 Livernois & Alaska Aves., Detroit, Mich.

DIE-SINKING PRESSES

Baldwin-Lima-Hamilton Corp., Philadelphia 42 Pa.
 Kearney & Trecker Corp., Milwaukee, Wis.
 Verson Allsteel Press Co., 93rd St., & S. Kenwood Ave., Chicago, Ill.

DIE STOCKS

See Stocks, Die

DIES, Sheet Metal, Etc.

Bliss, E. W. Co., 1375 Raff Rd., S. W. Canton Ohio.
 Carboly Dept., General Electric Co., Box 237, Roosevelt Park Annex, Detroit 32, Mich.
 Chambersburg Engrg. Co., Chambersburg, Pa.
 Columbus Die-Tool & Mach Co., 955 Cleveland Ave., Columbus, Ohio.
 Dreis & Krupp Mfg. Co., 7416 Loomis Blvd., Chicago 36, Ill.
 Ferracute Mch. Co., Bridgeton, N. J.
 Metal Carbides Corp., Youngstown, Ohio.
 Niagara Mch. & Tool Wks., 683 Northland Ave., Buffalo, N. Y.
 Sheffield Corp., 721 Springfield St., Dayton 1, Ohio.
 Taft-Peirce Mfg. Co., Woonsocket, R. I.
 Verson Allsteel Press Co., 93rd St., and S. Kenwood Ave., Chicago, Ill.
 Wales-Strippet Corp., North Tonawanda, N. Y.
 Waltham Mch. Wks., Waltham, Mass.

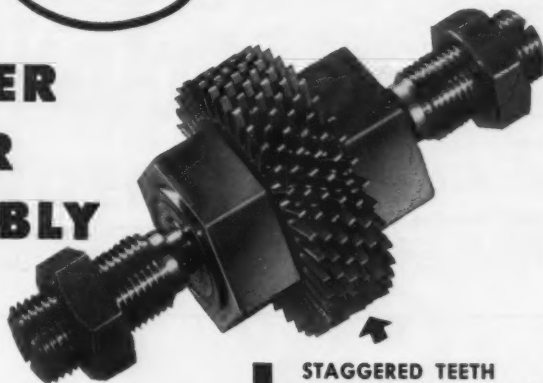
(Continued on page 460)

NEW!

BESLY

2½" Wise Type

DRESSER CUTTER ASSEMBLY



• DRESSES BETTER

• LASTS LONGER

Costs only **\$825**

Unlike broad toothed dressers, this new Besly Dresser Cutter Assembly sharpens abrasive discs *without crushing the surface*. Discs last longer, perform better. Grinding characteristics are not "softened" by the dressing action.

A unique "tru-square" spindle and interlocking spacer buttons lock cutters firmly in a staggered arrangement which provides a series of points of contact with the disc at all times. Non-staggered cutters "dig" into the abrasive—cause the dresser to vibrate and "bounce". Ball bearing holders provide almost frictionless rotation of the entire assembly. The new Assembly fits all Besly grinders using 2½" cutters and can be adapted to other dresser holders. Try one and cut your dressing costs. Send purchase order.

BESLY ALSO OFFERS A COMPLETE LINE OF CUTTING TOOLS

Taps • Drills • Reamers and End Mills • Tool Bits—high speed and carbide tipped • Gages—thread, plug, cylindrical and ring types

SEE YOUR BESLY DISTRIBUTOR OR WRITE US FOR CATALOG INFORMATION.



BESLY WELLES

CORPORATION

Established in 1875 as Chas. H. Besly & Co.

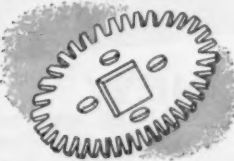
112 Dearborn Avenue
 BELOIT, WISCONSIN

STAGGERED TEETH

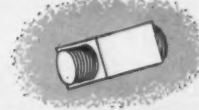
maintain continuous contact with disc—prevent "digging" and dresser "bouncing" common to other dresser cutters.

**CUTS INSTEAD OF CRUSHING**

Slim fingers pick off abrasive grain, require less pressure than broad toothed cutters, last longer.

**FASTER, EASIER
ASSEMBLY**

Raised buttons on cutter eliminate need for spacing washers. Replacement cutter sets are taped together for quick mounting and proper "stagger". Just slip on and remove tape.

**NO CHEWED SPINDLES**

Square arbor plus interlocking buttons replace easily worn keyways, maintain proper tooth "stagger".

D

Product Directory

DIES, Threading

Butterfield Div., Union Twist Drill Co., Derby Line, Vt.
Card, S. W., Mfg., Mansfield, Mass.
Detroit Tap & Tool Co., 8615 E. 8 Mile Rd., Base Line, Mich.
Eastern Mch. Screw Corp., New Haven, Conn.
Geometric Tool Co., Westville Station, New Haven 15, Conn.
Greenfield Tap & Die Corp., Greenfield, Mass.
Hill Acme Co., 1201 W. 65th St., Cleveland 2, Ohio.
National Acme Co., 170 E. 131st St., Cleveland, Ohio.
Pratt & Whitney, West Hartford 1, Conn.
Reed Rolled Thread Die Co., P.O. Box 350, Worcester 1, Mass.
Sheffield Corp., 721 Springfield St., Dayton 1, Ohio.
Threadwell Tap & Die Co., Greenfield, Mass.
Winter Bros. Co., Rochester, Mich.

DIES, Threading, Opening

Eastern Mch. Screw Corp., New Haven, Conn.
Errington Mechanical Laboratory, 24 Norwood Ave., Stapleton, S. I., N. Y.

Geometric Tool Co., Westville Station, New Haven 45, Conn.
Hill Acme Co., 1201 W. 65th St., Cleveland 2, Ohio.
Jones & Lamson Mch. Co., 160 Clinton St., Springfield, Vt.
Landis Mch. Co., Waynesboro, Pa.
National Acme Co., 170 E. 131st St., Cleveland, Ohio.
Sheffield Corp., 721 Springfield St., Dayton 1, Ohio.

DIES, Thread Rolling

Detroit Tap & Tool Co., 8615 E. 8 Mile Rd., Base Line, Mich.
Pratt & Whitney, West Hartford 1, Conn.
Reed Rolled Thread Die Co., P.O. Box 350, Worcester 1, Mass.
Sheffield Corp., 721 Springfield St., Dayton 1, Ohio.

DISCS, Abrasives

Besley-Welles Corp. (Abrasives Div.) 20 N. Wacker Drive, Chicago 6, Ill.

Carborundum Co., Buffalo Ave., Niagara Falls, N. Y.
Gardner Machine Co., 414 E. Gardner St., Beloit, Wis.
Macklin Co., 2925 Wildwood Ave., Jackson, Mich.
Norton Co., 1 New Bond St., Worcester, Mass.
Simonds Abrasive Co., Tacony and Fraley Sts., Bridesburg, Philadelphia, Pa.
Smit, J. K. & Sons, Inc., Murray Hill, N. J.
Walls Sales Corp., 333 Nassau Ave., Brooklyn 22, N. Y.

DISINTEGRATORS

Elax Corp., 602 N. Rochester Rd., Clawson, Mich.

DIVIDING HEADS

See Indexing and Spacing Equipment

DOWELL PINS

Ollen Mfg. Co., 133 Sheldon St., Hartford 2, Conn.
Danly Mch. Specialties, Inc., 2107 S. 52nd Ave., Chicago 50, Ill.
DoAll Co., 254 N. Laurel Ave., Des Plaines, Ill.
Product Machine Co., 990 Housatonic Ave., Bridgeport, Conn.
U. S. Tool Co., Inc., 255 North 18th St., Ampere, N. J.

DRESSERS, Grinding Wheel

Besley-Welles Corp., 112 Dearborn Ave., Beloit, Wis.
Carbunuy Dept., General Electric Co., Box 237 Roosevelt Park Annex, Detroit 32, Mich.
Colonial Broach Co., P.O. Box 37, Harper Sta., Detroit 13, Mich.
DoAll Co., 254 N. Laurel Ave., Des Plaines, Ill.
Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit 32, Mich.
Metal Carbides Corp., Youngstown, Ohio.
Meyers, W. F. Co., Bedford, Ind.
Moore Special Tool Co., Inc., 724 Union Ave., Bridgeport, Conn.
Norton Co., 1 New Bond St., Worcester, Mass.
Sherr, George Co., Inc., 200 Lafayette St., New York 12, N. Y.
Sheffield Corp., 721 Springfield St., Dayton 1, Ohio.
Super Tool Co., 21650 Hoover Rd., Detroit 13, Mich.

DRIFTS, DRILL

Armstrong, Bros. Tool Co., 5200 W. Armstrong Ave., Chicago, Ill.
Chicago-Latrobe Twist Drill Works, 411 W. Ontario St., Chicago, Ill.
Cleveland Twist Drill Co., 1242 E. 49th St., Cleveland 14, Ohio.
Union Twist Drill Co., Athol, Mass.
Whitman & Barnes, 40600 Plymouth Rd., Plymouth, Mich.

DRILL HEADS, Multiple Spindle

Baker Bros., Inc., Station F, P.O. Box 101, Toledo 10, Ohio.
Barnes Drill Co., 814 Chestnut, Rockford, Ill.
Buffalo Forge Co., Broadway, Buffalo, N. Y.
Buhr Mch. Tool Co., 835 Green St., Ann Arbor, Mich.
Cincinnati Lathe & Tool Co., 3207-3211 Disney St., Cincinnati 9, Ohio.
Errington Mechanical Laboratory, 24 Norwood Ave., Stapleton, S. I., N. Y.
Etto Tool Co., Inc., 592 Johnson Ave., Brooklyn, N. Y.
Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit, Mich.
Govro-Nelson Co., Detroit 8, Mich.
Hartford Special Machinery Co., 287 Homestead Ave., Hartford 12, Conn.
Jarvis Corp., Middletown, Conn.
Millholland, W. K. Machinery Co., 6402 Westfield Blvd., Indianapolis 5, Ind.
Moline Tool Co., 102 20th St., Moline, Ill.
Snyder Tool & Engrg. Co., 3400 Lafayette, Detroit 7, Mich.
Thriftmaster Products Corp., 1076 N. Plum St., Lancaster, Pa.
United States Drill Head Co., 616 Burns, Cincinnati, Ohio.
Zager Tool, Inc., 24000 Lakeland Blvd., Cleveland 23, Ohio.

DRILL HEADS, Unit Type

Barnes Drill Co., 814 Chestnut, Rockford, Ill.
Hartford Special Machinery Co., 287 Homestead Ave., Hartford 12, Conn.
Kingsbury Mch. Tool Corp., Keene, N. H.
Millholland, W. K. Machinery Co., 6402 Westfield Blvd., Indianapolis 5, Ind.
Morris Machine Tool Co., Inc., 946-H Harriet St., Cincinnati 3, Ohio.
Rehnberg-Jacobson Mfg. Co., 2135 Kishwaukee St., Rockford, Ill.
Snow Mfg. Co., 435 Eastern Ave., Bellwood, Ill.

(Continued on page 462)



**NEW
GREAVES
TOOLMAKERS
OVERARM**

Here's the way to add new "firepower" to toolroom milling operations! Install in your toolroom a GREAVES MILL equipped with this new Toolmakers Overarm.

You'll discover new versatility for milling intricate jig and fixture work, for keywaying, slotting and angular milling. Two graduated swivels permit mounting the spindle head in almost any angle for milling, drilling, spot facing and related operations.

Powered by an independent 2 HP motor, the unit is driven through helical gears. Eight speeds may be selected with convenient controls operating speed change clutches. A hand-fed quill attachment provides 4" tool travel to the spindle. Arbor support fits overarm, permits arbor type milling without changing overarm.

Write for Complete Specifications and Prices

GREAVES MACHINE TOOL DIVISION
J. A. FAY & EGAN COMPANY
Eastern Avenue, Cincinnati 2, Ohio

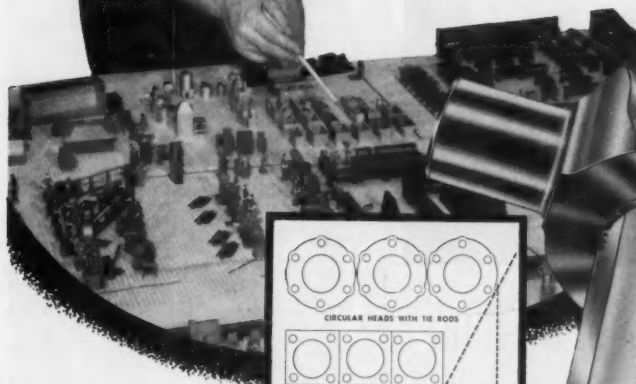
- Swivels permit any angular setting spindle head.
 - 2 HP independent motor drive.
 - 8 speeds from 175 to 1750 RPM.
 - Quill has 4" hand feed.
 - Spindle equipped with No. 50 N. S. taper; reduced to No. 2 Morse taper when Quill Attachment is used.
 - Gears run in oil bath.
 - Full vision oil level gauge.
- RACK FEED.** The overarm is equipped with rack feed for positioning over work.

BOOTH No. 721
National Machine Tool Show

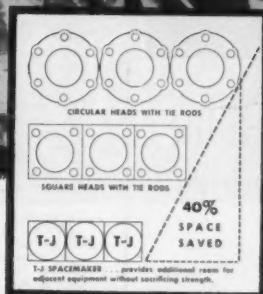
Manufacturers of
GREAVES MILLS
"the MOST Mill for the LEAST Money!"

Automate for top performance with . . .

(T-J) Spacemaker CYLINDERS



Style
SM5
shown



- The Only Cylinders with all the Extras as Standard
- OIL pressure to 750—AIR to 200 P.S.I.
- New Compact Design . . . Saves up to 40% Space
- Proven Performance . . . with Extra High Safety Factor
- Super Cushion Flexible Seals for Air . . . New Self-Aligning Master Oil Cushion
- Hard Chrome Plated Bodies and Piston Rods (Standard)
- Only from T-J can you get these new ingenious cushion designs

More and more of industry's automation problems today—solved with T-J Spacemaker Cylinders! New compact design and many more plus features for a new high in efficient cylinder performance and dependability. Wide range of styles, capacities . . . to help you *save labor, reduce costs* on all kinds of push-pull-lift jobs. Send for bulletin SM-155-1. The Tomkins-Johnson Co., Jackson, Mich.

**OFF SHELF
DELIVERY**

Member of the National
Fluid Power Association

(T-J) TOMKINS-JOHNSON
RIVETORS AIR AND HYDRAULIC CYLINDERS CUTTERS CLIMBERS

DRILL SOCKETS

Armstrong Bros. Tool Co., 5200 W. Armstrong Ave., Chicago, Ill.
 Cleveland Twist Drill Co., Cleveland, Ohio.
 Greenfield Tap & Die Corp., Greenfield, Mass.
 National Twist Drill & Tool Co., Rochester, Mich.
 Pratt & Whitney, West Hartford 1, Conn.
 Scully-Jones & Co., 1903 Rockwell St., Chicago 8, Ill.
 Union Twist Drill Co., Athol, Mass.
 Whitman & Barnes, 40600 Plymouth Rd., Plymouth, Mich.

DRILL STANDS

Cleveland Twist Drill Co., 1242 E. 49th St., Cleveland, Ohio.
 Greenfield Tap & Die Corp., Greenfield, Mass.
 National Twist Drill & Tool Co., Rochester, Mich.
 Standard Electrical Tool Co., 2488-90 River Rd., Cincinnati 4, Ohio.

Union Twist Drill Co., Athol, Mass.
 Whitman & Barnes, 40600 Plymouth Rd., Plymouth, Mich.

DRILLING MACHINES, Automatic

Avey Drilling Mch. Co., 26 E. Third St., Covington, Ky.
 Baker Bros., Inc., Station F, P.O. Box 101, Toledo 10, Ohio.
 Barnes Drill Co., 814 Chestnut Rockford, Ill.
 Barnes, W. F. & John Co., 201 S. Water St., Rockford, Ill.
 Baush Machine Tool Co., 156 Wason Ave., Springfield 7, Mass.
 Bodine Corp., Mt. Grove St., Bridgeport, Conn.
 Buhr Mch. Tool Co., 835 Green St., Ann Arbor, Mich.
 Consolidated Mch. Tool Corp., Rochester, N. Y.
 Cross Co., 3250 Bellevue, Detroit 7, Mich.
 Hartford Special Mchry. Co., 287 Homestead St., Hartford, Conn.
 Kingsbury Mch. Tool Corp., Keene, N. H.

Millholland, W. K. Machinery Co., 6402 Westfield Blvd., Indianapolis 5, Ind.
 Morris Machine Tool Co., 946-M Harriet St., Cincinnati 3, Ohio.
 National Automatic Tool Co., Inc., S. 7th and N. Sts., Richmond, Ind.
 Snow Mfg. Co., 435 Eastern Ave., Bellwood, Ill.
 Snyder Tool & Engrg. Co., 3400 E. Lafayette, Detroit 7, Mich.
 Wales-Strippet Corp., North Tonawanda, N. Y.
 Zager Tool, Inc., 24000 Lakeland Blvd., Cleveland 23, Ohio.

DRILLING MACHINES, Bench

Atlas Press Co., Kalamazoo, Mich.
 Avey Drilling Mch. Co., 126 E. Third St., Covington, Ky.
 Buffalo Forge Co., 490 Broadway, Buffalo, Cincinnati Lathe & Tool Co., 3207-3211 Disney St., Cincinnati 9, Ohio.
 Edlund Machinery Co., Cortland, N. Y.
 Famco Machine Co., 3134 Sheridan Rd., Kenosha, Wis.
 Fosdick Mch. Tool Co., 1638 Blue Rock, Cincinnati 23, Ohio.
 Hamilton Tool Co., 834 S. 9th St., Hamilton, Ohio.
 Leland-Gifford Co., 1025 Southbridge St., Worcester, Mass.
 South Bend Lathe Works, Inc., 425 E. Madison St., South Bend, Ind.
 Standard Electrical Tool Co., 2488-90 River Rd., Cincinnati, Ohio.

DRILLING MACHINES, Boiler

Cincinnati Bickford Tool Co., 3220 Forrer Ave., Cincinnati, Ohio.
 Foote-Burt Co., 1300 St. Clair Ave., Cleveland.

DRILLING MACHINES, Deep Hole

Avey Drilling Mch. Co., 26 E. Third St., Covington, Ky.
 Leland-Gifford Co., 1025 Southbridge St., Worcester, Mass.
 National Automatic Tool Co., Inc., S. 7th and N. Sts., Richmond, Ind.
 Pratt & Whitney, West Hartford 1, Conn.
 Wales-Strippet Corp., North Tonawanda, N. Y.

DRILLING MACHINES, Gang

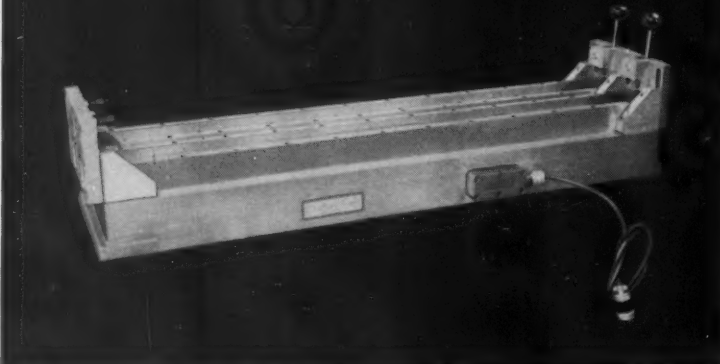
Avey Drilling Mch. Co., 26 E. Third St., Covington, Ky.
 Baker Bros., Inc., Station F, P.O. Box 101, Toledo 10, Ohio.
 Barnes Drill Co., 814 Chestnut, Rockford, Ill.
 Baush Machine Tool Co., 156 Wason Ave., Springfield 7, Mass.
 Cincinnati Bickford Tool Co., 3220 Forrer Ave., Cincinnati, Ohio.
 Cleereman Mch. Tool Co., Green Bay, Wis.
 Consolidated Mch. Tool Corp., Rochester, N. Y.
 Edlund Machinery Co., Cortland, N. Y.
 Foote-Burt Co., 1300 St. Clair Ave., Cleveland
 Fosdick Mch. Tool Co., 1638 Blue Rock, Cincinnati 23, Ohio.
 Ingersoll Milling Mch. Co., 2442 Douglas St., Rockford, Ill.
 Leland-Gifford Co., 1025 Southbridge St., Worcester, Mass.
 Moline Tool Co., 102 20th St., Moline, Ill.
 Morris Machine Tool Co., Inc., 946-M Harriet St., Cincinnati 3, Ohio.
 National Automatic Tool Co., Inc., S. 7th and N. Sts., Richmond, Ind.
 Snyder Tool & Engrg. Co., 3400 E. Lafayette, Detroit 7, Mich.

DRILLING MACHINES, Horiz.

Avey Drilling Mch. Co., 26 E. Third St., Covington, Ky.
 Baker Bros., Inc., Station F, P.O. Box 101, Toledo 10, Ohio.
 Barnes Drill Co., 814 Chestnut, Rockford, Ill.
 Barnes, W. F. & John Co., 201 S. Water St., Rockford, Ill.
 Baush Machine Tool Co., 156 Wason Ave., Springfield 7, Mass.
 Buhr Mch. Tool Co., 835 Green St., Ann Arbor, Mich.
 Consolidated Mch. Tool Corp., Rochester, N. Y.
 Cross Co., 3250 Bellevue, Detroit 7, Mich.
 Davis & Thompson Co., 6411 W. Burnham St., Milwaukee 14, Wis.
 Edlund Machinery Co., Cortland, N. Y.
 Frew Machine Co., 121 East Luray St., Philadelphia 20, Pa.
 Hartford Special Machinery Co., 287 Homestead Ave., Hartford 12, Conn.
 Kingsbury Mch. Tool Corp., Keene, N. H.

(Continued on page 466)

Walker Does It Again-



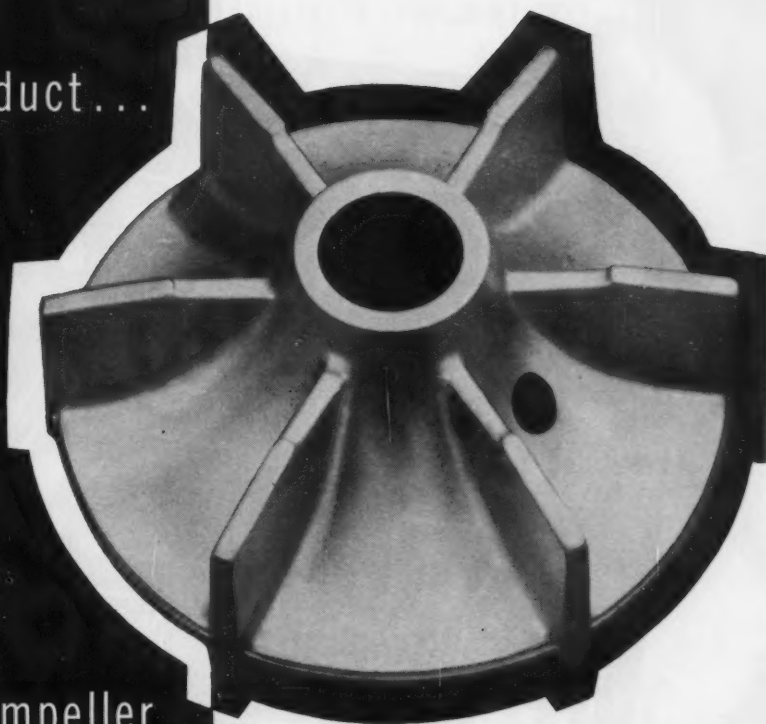
1. Walker designs and builds intricate magnetic fixtures for the automotive and aircraft industries.
2. Accurate and positive holding assured.
3. Consult Walker Engineers for the solution of your holding problems.

O. S. WALKER CO. Inc.

WORCESTER 6, MASSACHUSETTS

Original Designers and Builders of Magnetic Chucks

another case where
MUELLER BRASS CO.
FORGINGS
improve a product...



diesel engine
water pump impeller
forged of "603" **HIGH STRENGTH BRONZE**

Formerly produced as sand castings, these impellers now give better results because they're forged from "603" high strength bronze by the Mueller Brass Co. Said to be "right for the job and far superior to the old cast impellers", these forgings bring greater efficiency and longer life to the diesel engine water pumps in which they are installed. This tough "600" series alloy is readily forgeable, possesses remarkable resistance to corrosion, and has fine bearing qualities. Uniformity is excellent, due to the closer dimensional control of the forging process, and surface finish is noticeably smoother. This is another case where Mueller Brass Co. forgings have greatly improved a product . . . why not let our engineers show you the many advantages of using forgings.

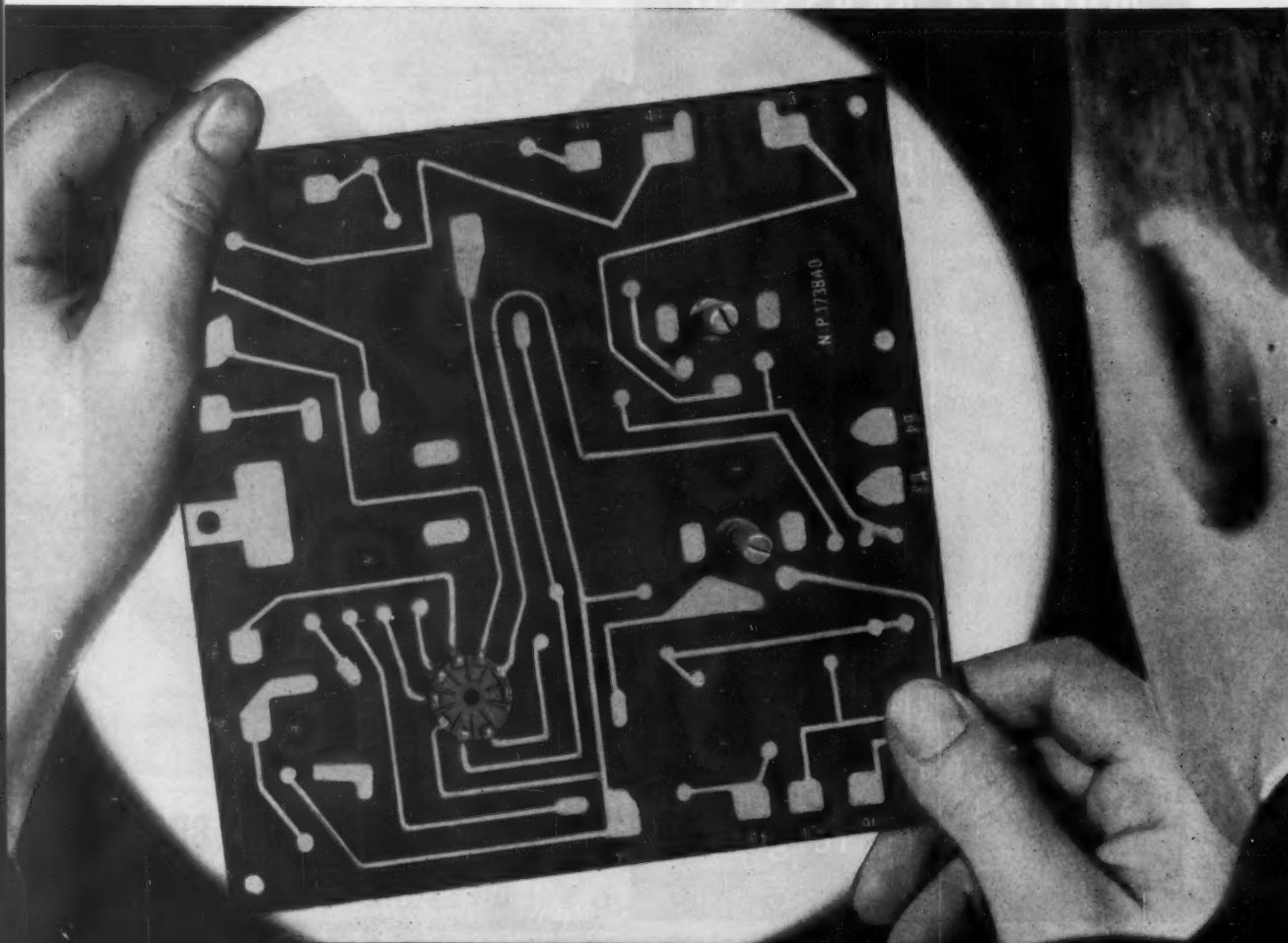


MUELLER BRASS CO.

PORT HURON 35, MICHIGAN

GENERAL ELECTRIC ANNOUNCES . . .

NEW, Low-price Thy-mo-trol*



Printed Circuits—or “wireless” circuitry—constitute the “brains” of the new general purpose Thy-mo-trol Drives. Simply, it is a method of printing an electrical diagram on the back of a sturdy, lightweight plastic board. The electrical “track” or diagram is made of solder-covered copper strips.

All circuit components within the “brain” are connected without the use of wiring! A protective coating is sprayed over the entire printed circuit. All connections to the control circuits are of the simple “plug-in” type, making attachment and removal of connecting circuits a simple, hand operation.



“Brain” of new Thy-mo-trol Drive—printed control circuits. Top photo shows printed electrical diagram. G.E.’s industrial adaptation of this process helps reduce size and complexity of circuits. In lower photo, new at left, conventional at right.

Drive with Printed Control Circuits

NOW! GET RELIABLE, SMOOTH, ADJUSTABLE SPEED FOR MACHINE TOOLS IN A SIMPLIFIED, LOW-PRICED DESIGN

Designed for quality performance, reliable operation, easy maintenance, and at a new low price, a new and simplified line of general purpose Thy-mo-trol Drives has been developed by General Electric. These drives represent a new and far-reaching step in electronic adjustable speed.

An approximate 20% price reduction under the line it replaces is possible because G-E has successfully simplified the entire control system and has adapted printed control circuits into the Thy-mo-trol panels. New Thy-mo-trol design allows a substantial reduction in

weight, size, circuit complexity, wiring, maintenance costs and installation cost. The new design is now available in two ratings: $\frac{3}{4}$ to 1 hp and $1\frac{1}{2}$ to 3 hp—making your choice of an adjustable speed drive to meet specific needs that much easier.

Operating directly from a-c power, the new standard Thy-mo-trol Drive includes an electronic control panel, a d-c motor, and a push-button station. No anode transformer is necessary if operated on 440 volts, 50 or 60 cycle, single phase power. Separately mounted auto-transformers are supplied as a

standard feature for voltages other than 440.

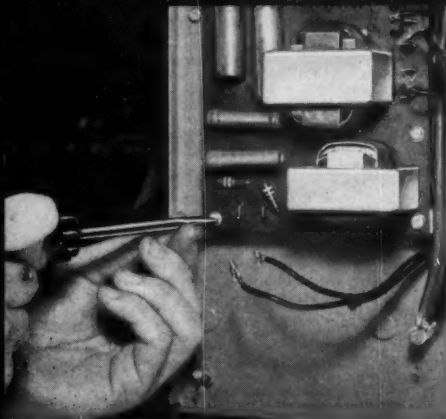
The new drive is rated at constant torque over the entire speed range. Speed range is 8 to 1 for continuous duty with higher ranges possible for special applications. Optional modifications include jogging, reversing, tachometer feedback, reactor loop control, and external current limit adjustment.

For more information on this outstanding new adjustable speed drive, contact your nearest G-E Apparatus Sales Office or write for Bulletin GEA-6234, General Electric Company, Section 791-1, Schenectady 5, New York.

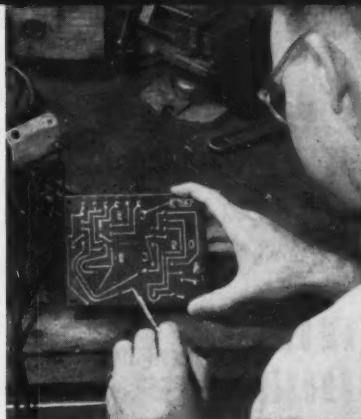
Progress Is Our Most Important Product

GENERAL  ELECTRIC

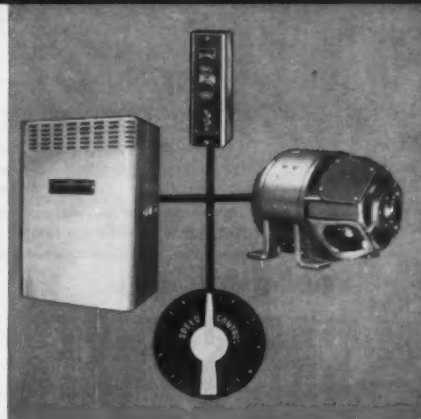
*Registered Trade-mark of General Electric Company



Easily attached or removed. Only a screwdriver is needed. Plugs and terminals are numbered for easier service.

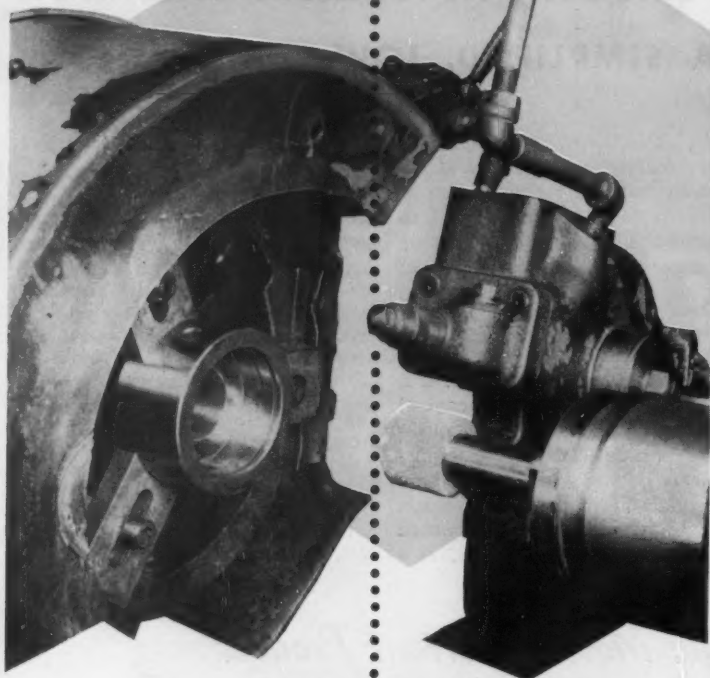


Simplified repair. Component replacement is fast and easy—a simple bench operation. No need to discard entire unit.



Three basic units. DC motor, pushbutton station, and panel containing tubes and "brain" make up new Thy-mo-trol Drive.

Christensen. diamond tools at FORMSPRAG



Reduce wheel grinding costs...



Mass precision grinding performed at the Formsprag Company of Van Dyke, Michigan in the manufacture of clutches requires low cost mass precision wheel dressing. That is why economy-minded engineers at Formsprag look for the tool with the long-lived precision dress—a Christensen diamond tool. Christensen diamond tools are set with first-quality stones to give longer, more accurate, lower-cost service. The tool shown above, Type T-7155, used on a Heald Internal Grinder, cut diamond tool cost 50%.

At left is the Christensen Type T-725 single stone, large head wheel dressing tool for use as a general purpose tool for straight or form dressing on centerless, cylindrical, surface and other grinders in general use. It is a practical tool to use in the shop where usage is low or where a diamond tool is issued to each individual operator.

There is a Christensen diamond tool that can help reduce your dressing costs. Call a Christensen man or write for our catalog No. 700.

tool division

CHRISTENSEN

DIAMOND PRODUCTS

1937 SOUTH SECOND WEST SALT LAKE CITY, UTAH



Millholland, W. K. Machinery Co., 6402 Westfield Blvd., Indianapolis 5, Ind.
Moline Tool Co., 102 20th St., Moline, Ill.
Morris Machine Tool Co., Inc., 946-M Harriet St., Cincinnati 3, Ohio.
National Automatic Tool Co., Inc., S. 7th and N. Sts., Richmond, Ind.
Snow Mfg. Co., 435 Eastern Ave., Bellwood, Ill.
Snyder Tool & Engrg. Co., 3400 E. Lafayette, Detroit 7, Mich.
Sundstrand Mch Tool Co., 2531 11th St., Rockford, Ill.

DRILLING MACHINES, Horizontal Portable

Avey Drilling Mch. Co., 26 E. Third St., Covington, Ky.
Cincinnati Bickford Tool Co., 3220 Farrow Ave., Cincinnati, Ohio.

DRILLING MACHINES, Inverted

Avey Drilling Mch. Co., 26 E. Third St., Covington, Ky.
Baker Bros., Inc., Station F, P.O. Box 101, Toledo 10, Ohio.
Barnes Drill Co., 814 Chestnut, Rockford, Ill.
Baush Machine Tool Co., 156 Wason Ave., Springfield 7, Mass.
Morris Machine Tool Co., Inc., 946-M Harriet St., Cincinnati 3, Ohio.
National Automatic Tool Co., Inc., S. 7th and N. Sts., Richmond, Ind.
Snyder Tool & Engrg. Co., 3400 E. Lafayette, Detroit 7, Mich.

DRILLING MACHINES, Multiple Center Column Type

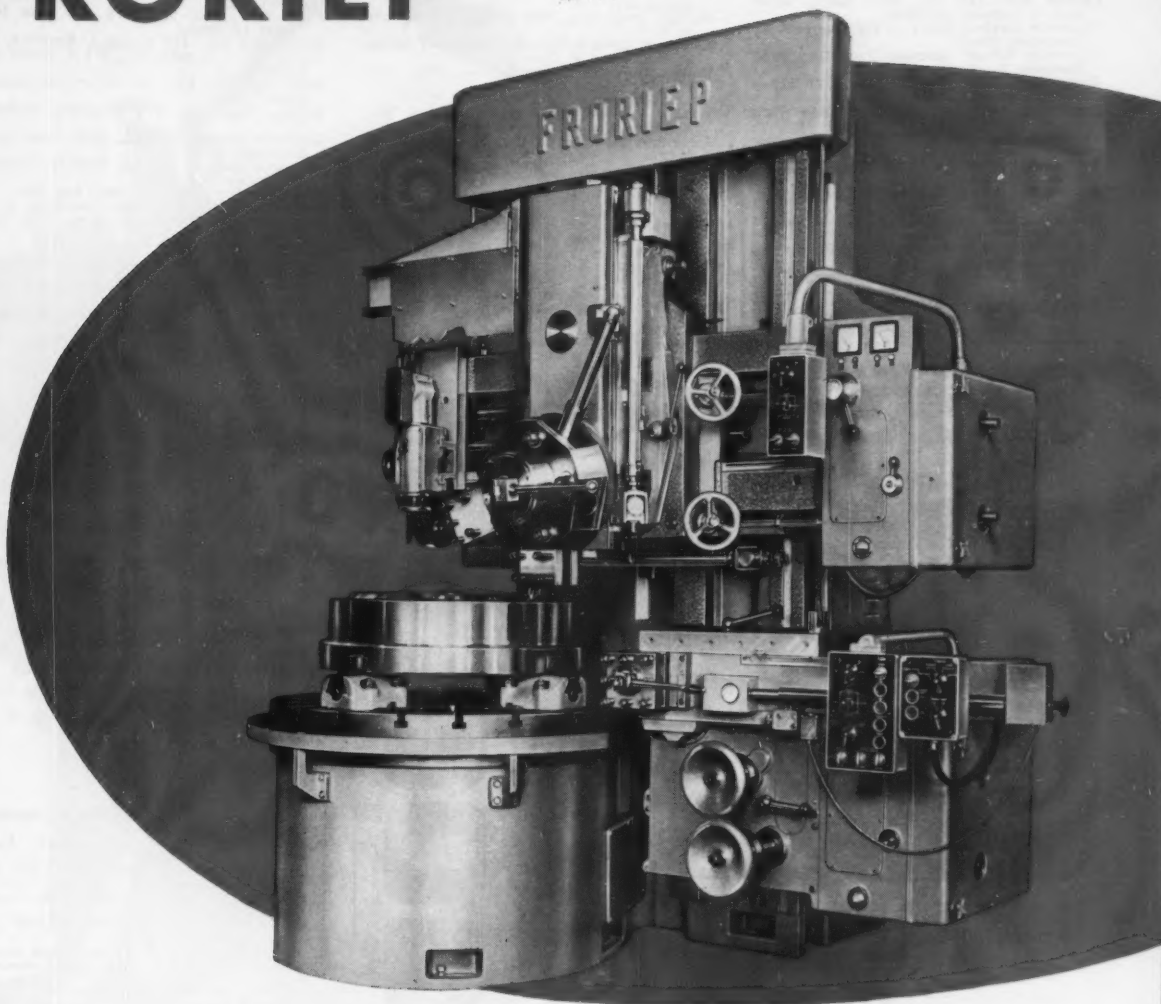
Avey Drilling Mch. Co., 26 E. Third St., Covington, Ky.
Barnes Drill Co., 814 Chestnut, Rockford, Ill.
Buhr Mch. Tool Co., 835 Green St., Ann Arbor, Mich.
Cross Co., 3250 Bellevue, Detroit 7, Mich.
Morris Machine Tool Co., Inc., 946-M Harriet St., Cincinnati 3, Ohio.
National Automatic Tool Co., Inc., S. 7th and N. Sts., Richmond, Ind.

DRILLING MACHINES, Multiple Spindle

Avey Drilling Mch. Co., 26 E. Third St., Covington, Ky.
Baker Bros., Inc., Station F, P.O. Box 101, Toledo 10, Ohio.
Barnes Drill Co., 814 Chestnut, Rockford, Ill.
Barnes, W. F. & John, Co., 201 S. Water St., Rockford, Ill.
Baush Machine Tool Co., 156 Wason Ave., Springfield 7, Mass.
Buffalo Forge Co., 490 Broadway, Buffalo 14, N. Y.
Buhr Mch. Tool Co., 835 Green St., Ann Arbor, Mich.
Burg Tool Mfg. Co., 3743 Durango Ave., Los Angeles 34, Cal.
Cincinnati Bickford Tool Co., 3220 Farrow Ave., Cincinnati, Ohio.
Cincinnati Lathe & Tool Co., 3207-3211 Disney St., Cincinnati 9, Ohio.
Cleereman Mch. Tool Co., Green Bay, Wis.
Cleveland Tapping Machine Co., 1201 Camden Ave., S. W., Canton 6, Ohio.
Cosa Corp., 405 Lexington Ave., New York 17.
Cross Co., 3250 Bellevue Ave., Detroit 7, Mich.
Davis & Thompson Co., 6411 W. Burnham St., Milwaukee 14, Wis.
Edlund Machinery Co., Cortland, N. Y.
Famco Machine Co., 3134 Sheridan Rd., Kenosha, Wis.
Fosdick Mch. Tool Co., 1638 Blue Rock, Cincinnati 23, Ohio.
Greenlee Bros. & Co., 12th and Columbia Ave., Rockford, Ill.
Hartford Special Mchry. Co., 287 Homestead St., Hartford, Conn.
Ingersoll Milling Mch. Co., 2442 Douglas St., Rockford, Ill.
Kingsbury Mch. Tool Corp., Keene, N. H.
Leland-Gifford Co., 1025 Southbridge St., Worcester, Mass.
Michigan Drill Head Co., Detroit 34, Mich.
Millholland, W. K. Machinery Co., 6402 Westfield Blvd., Indianapolis 5, Ind.
Modern Ind. Engrg. Co., 14230 Birwood Ave., Detroit 4, Mich.
Moline Tool Co., 102 20th St., Moline, Ill.
Morris Machine Tool Co., Inc., 946-M Harriet St., Cincinnati 3, Ohio.
National Automatic Tool Co., Inc., S. 7th and N. Sts., Richmond, Ind.
Pratt & Whitney, West Hartford 1, Conn.
Snow Mfg. Co., 435 Eastern Ave., Bellwood, Ill.
Snyder Tool & Engrg. Co., 3400 E. Lafayette, Detroit, Mich.
South Bend Lathe Works, Inc., 425 E. Madison St., South Bend, Ind.
Zagar Tool, Inc., 24000 Lakeland Blvd., Cleveland 23, Ohio.

(Continued on page 468)

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 Carlton Mch. Tool Co., 3000 Spring Grove Ave., Cincinnati 25, Ohio.
 Cincinnati Bickford Tool Co., 3220 Farrer Ave., Cincinnati, Ohio.
 Cincinnati Gilbert Machine Tool Co., 3366 Beekman St., Cincinnati 23, Ohio.
 Cincinnati Lathe & Tool Co., 3207-3211 Disney St., Cincinnati 9, Ohio.
 Cosa Corp., 405 Lexington Ave., New York 17, N. Y.
 Foote-Burt Co., 1300 St. Clair Ave., Cleveland, Ohio.
 Fosdick Mch. Tool Co., 1638 Blue Rock, Cincinnati 23, Ohio.
 Modern Ind. Engrg. Co., 14230 Birwood Ave., Detroit 4, Mich.
 Morris Machine Tool Co., Inc., 946-M Harriet St., Cincinnati 3, Ohio.
 Onsrud Machine Works, Inc., 3940 Palmer St., Chicago, Ill.

DRILLING MACHINES, Rail

See Drilling Machines, Gang

DRILLING MACHINES, Sensitive

Atlas Press Co., Kalamazoo, Mich.
 Avey Drilling Mch. Co., 26 E. Third St., Covington, Ky.
 Buffalo Forge Co., 490 Broadway, Buffalo, N. Y.
 Cincinnati Lathe & Tool Co., 3207-3211 Disney St., Cincinnati 9, Ohio.
 Cosa Corp., 405 Lexington Ave., New York 17, N. Y.
 Edlund Machinery Co., Cortland, N. Y.
 Famco Machine Co., 3134 Sheridan Rd., Kenosha, Wis.
 Foote-Burt Co., 1300 St. Clair Ave., Cleveland, Ohio.
 Hamilton Tool Co., 834 S. 9th St., Hamilton, Ohio.
 Leland-Gifford Co., 1025 Southbridge St., Worcester, Mass.
 National Automatic Tool Co., Inc., S. 7th and N. St., Richmond, Ind.
 Pratt & Whitney, West Hartford 1 Conn.
 Ryerson, Jos. T. & Son, Inc., 2558 W. 16th St., Chicago 18, Ill.
 Snow Mfg. Co., 435 Eastern Ave., Bellwood, Ill.
 South Bend Lathe Works, Inc., 425 E. Madison St., South Bend, Ind.
 Wales-Strippet Corp., North Tonawanda, N. Y.

DRILLING MACHINES, Upright

Atlas Press Co., Kalamazoo, Mich.
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 Barnes Drill Co., 814 Chestnut, Rockford, Ill.
 Barnes, W. F. & John, Co., 201 S. Water St., Rockford, Ill.
 Baush Mch. Tool Co., 156 Wason Ave., Springfield 7, Mass.
 Buffalo Forge Co., 490 Broadway, Buffalo, N. Y.
 Cincinnati Bickford Tool Co., 3220 Farrer Ave., Cincinnati, Ohio.
 Cincinnati Lathe & Tool Co., 3207-3211 Disney St., Cincinnati 9, Ohio.
 Cleereman Mch. Tool Co., Green Bay, Wis.
 Consolidated Mch. Tool Corp., Rochester, N. Y.
 Cosa Corp., 405 Lexington Ave., New York 17, N. Y.
 Edlund Machinery Co., Cortland, N. Y.
 Foote-Burt Co., 1300 St. Clair Ave., Cleveland 8, Ohio.
 Fosdick Mch. Tool Co., 1638 Blue Rock, Cincinnati 23, Ohio.
 Hartford Special Mchry Co., 287 Homestead St., Hartford, Conn.
 Ingersoll Milling Mch. Co., 2442 Douglas St., Rockford, Ill.
 Leland-Gifford Co., 1025 Southbridge St., Worcester, Mass.
 Moline Tool Co., 102 20th St., Moline, Ill.
 National Automatic Tool Co., Inc., S. 7th and N. St., Richmond, Ind.
 Orban, Kurt & Co., Inc., 205 E. 42nd St., New York 17, N. Y.
 Rehnberg-Jacobson Mfg. Co., 2135 Kishwaukee St., Rockford, Ill.
 Ryerson, Jos. T. & Son, Inc., 2558 W. 16th St., Chicago 18, Ill.
 Snow Mfg. Co., 435 Eastern Ave., Bellwood, Ill.
 Snyder Tool & Engrg. Co., 3400 E. Lafayette, Detroit 7, Mich.
 South Bend Lathe Works, Inc., 425 E. Madison St., South Bend, Ind.
 Wales-Strippet Corp., North Tonawanda, N. Y.

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 Consolidated Mch. Tool Corp., Rochester, N. Y.

DRILLS Center

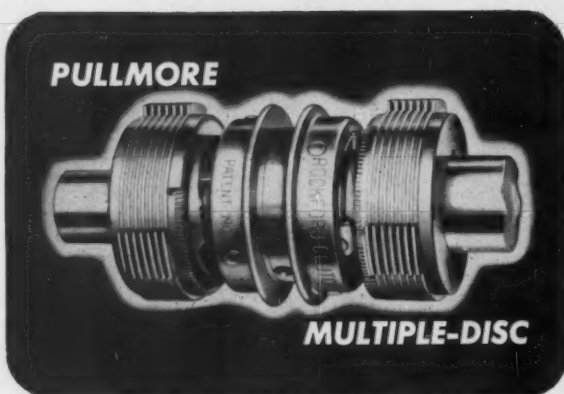
The Atrax Co. (Carbide) 240 Day St., Newington 11, Conn.
 Besley-Welles Corp., 112 Dearborn Ave., Beloit, Wis.
 Chicago-Latrobe Twist Drill Works, 411 W. Ontario St., Chicago, Ill.
 Circular Tool Co., Inc., 765 Allens Ave., Providence 5, R. I.
 Cleveland Twist Drill Co., 1242 E. 49th St., Cleveland, Ohio.
 Greenfield Tap & Die Corp., Greenfield, Mass.
 National Twist Drill & Tool Co., Rochester, Mich.
 Union Twist Drill Co., Athol, Mass.
 Whitman & Barnes, 40600 Plymouth Rd., Plymouth, Mich.

DRILLS, Core

Besley-Welles Corp., 112 Dearborn Ave., Beloit, Wis.
 Carboloy Dept., General Electric Co., Box 237 Roosevelt Park Annex, Detroit 32, Mich.
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 Cleveland Twist Drill Co., 1242 E. 49th St., Cleveland 14, Ohio.
 Eclipse Counterbore Co., 1600 Banner Ave., Ferndale, Mich.
 Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit 32, Mich.
 Firth Sterling, Inc., 3113 Forbes St., Pittsburgh 30, Pa.
 Gairing Tool Co., 21225 Hoover Rd., Detroit 32, Mich.
 Haynes Stellite Div., Union Carbide & Carbon Corp., 30 E. 42nd St., New York, N. Y.
 McCroskey Tool Corp., 1938 Thomas St., Meadville, Pa.
 National Twist Drill & Tool Co., Rochester, Mich.
 Scully-Jones & Co., 1903 Rockwell St., Chicago 8, Ill.
 Smit, J. K., & Sons, Inc., Murray Hill, N. J.
 Super Tool Co., 21650 Hoover Rd., Detroit 13, Mich.
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(Continued on page 472)

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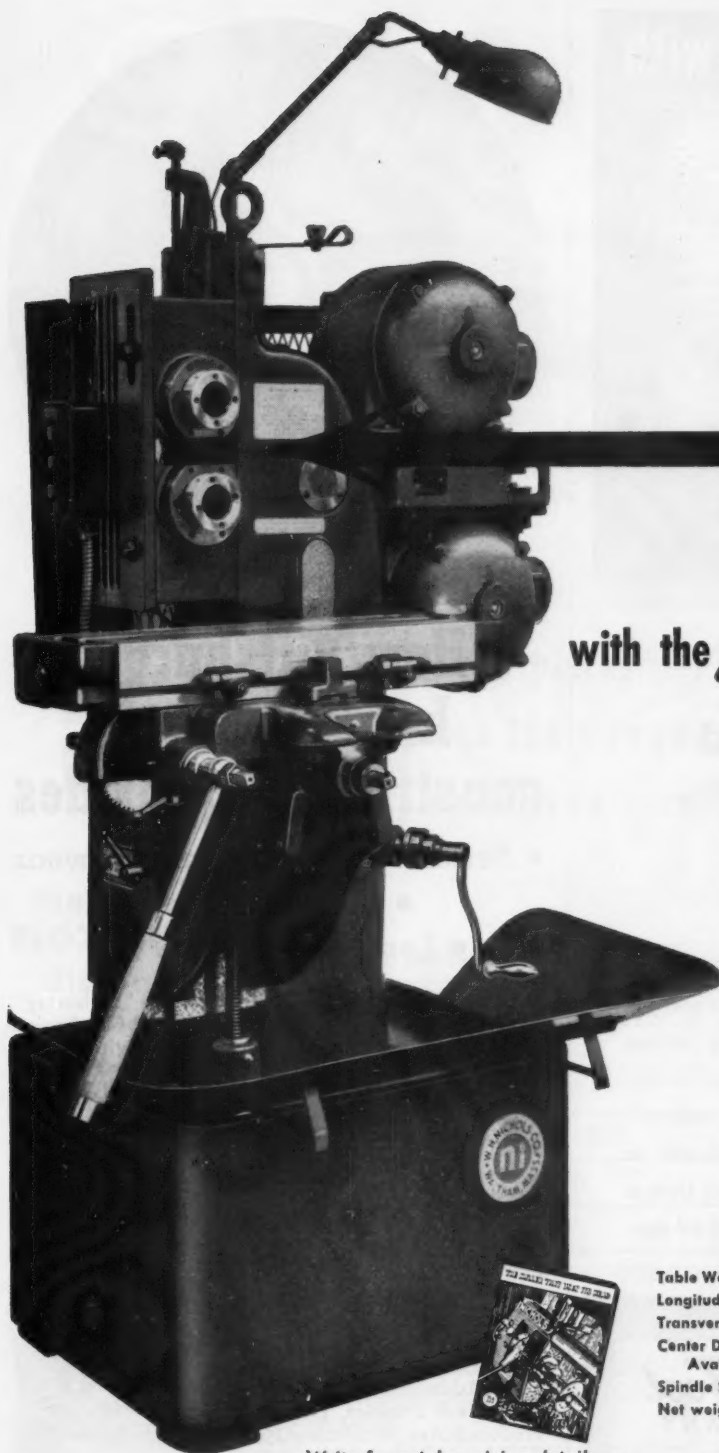
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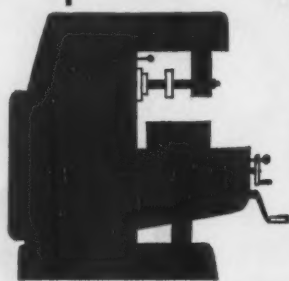
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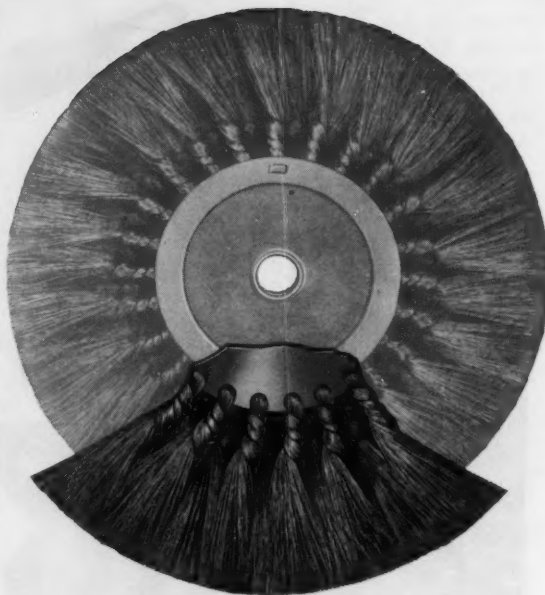
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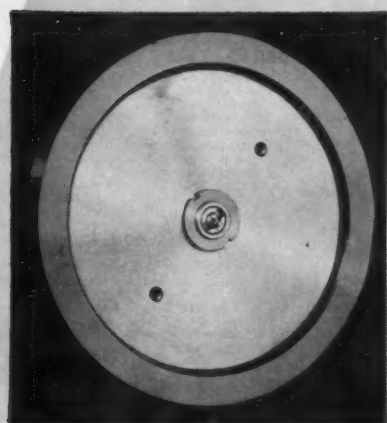
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Pratt & Whitney, West Hartford 1, Conn.
Smit, J. K., & Sons, Inc., Murray Hill, N. J.
Union Twist Drill Co., Athol, Mass.
Whitman & Barnes, 40600 Plymouth Rd.,
Plymouth, Mich.

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Millers Falls Co., Greenfield, Mass.
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Standard Electrical Tool Co., 2488-90 River Rd.,
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Onsrud Machine Works, Inc., 3940 Palmer St.,
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Chicago-Latrobe Twist Drill Works, 411 W.
Ontario St., Chicago, Ill.
Cleveland Twist Drill Co., 1242 E. 49th St.,
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Pratt & Whitney, West Hartford 1, Conn.
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DoAll Co., 254 N. Laurel Ave., Des Plaines, Ill.
Firth Sterling Inc., 3113 Forbes St., Pittsburgh
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Greenfield Tap & Die Corp., Greenfield, Mass.
National Twist Drill & Tool Co., Rochester,
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(Continued on page 476)

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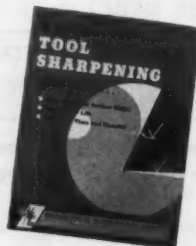
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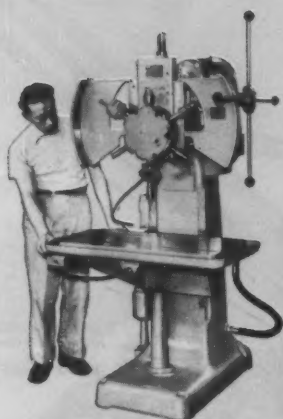
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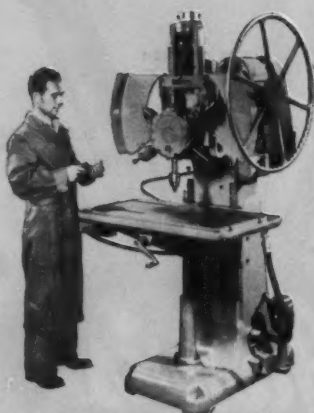
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MACHINERY, September, 1955—473



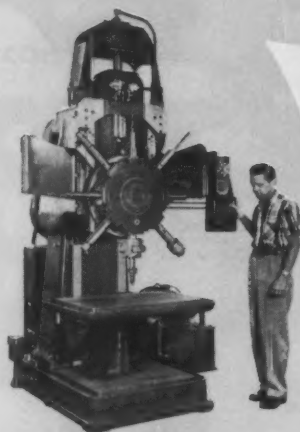
MODEL 2A—hand operated, 6-spindle



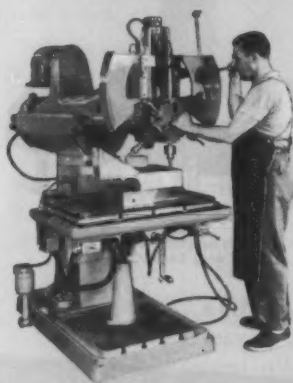
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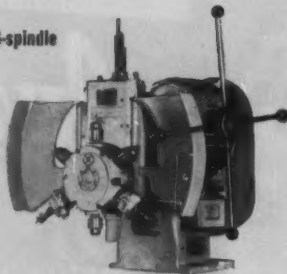


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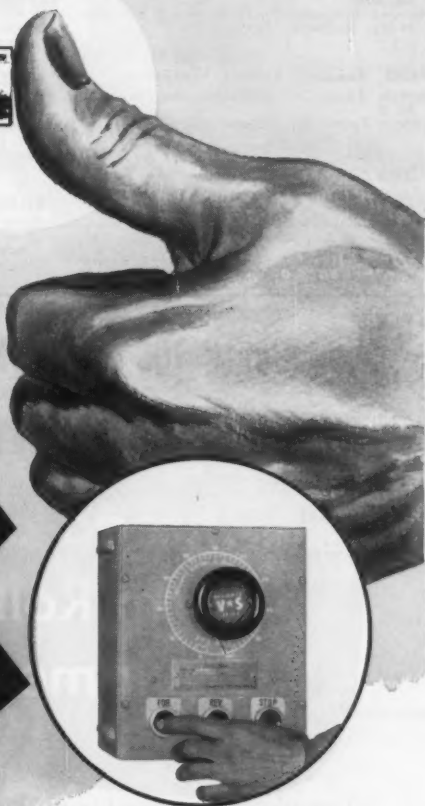
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 Nicholson File Co., 23 Acorn St., Providence, R. I.
 Simonds Saw & Steel Co., 470 Main St., Fitchburg, Mass.

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 Oliver Instrument Co., 1410 E. Maumee St., Adrian, Mich.

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Barnes Drill Co., 814 Chestnut St., Rockford, Ill.
 Industrial Filtration Co. (Delpark Corp.) 15 Industrial Ave., Lebanon, Ind.

FINISHES FOR MACHINE AND METAL PARTS

Lowe Bros. Co., Dayton, Ohio.
 Parker Rust Proof Co., 2194 E. Milwaukee, Detroit 11, Mich.

FLEXIBLE COUPLINGS

See Couplings, Flexible

FLEXIBLE SHAFT EQUIPMENT

Jarvis Corp., Middletown, Conn.
 Pratt & Whitney, West Hartford 1, Conn.

FORGINGS, Machines (Upsetting)

Ajax Mfg. Co., Euclid, Cleveland 17, Ohio.
 Baldwin-Lima-Hamilton Corp., Eddystone Div., Philadelphia 42, Pa.
 Hill Acme Co., 1201 W. 65th St., Cleveland 2, Ohio.
 National Machinery Co., Greenfield and Stanton Sts., Tiffin, Ohio.
 Orban, Kurt & Co., Inc., 205 E. 42nd St., New York 17, N. Y.

FORGINGS, Drop

Bethlehem Steel Co., Bethlehem, Pa.
 Mueller Brass Co., Port Huron 35, Mich.
 Williams, J. H. & Co., 400 Vulcan St., Buffalo 7, N. Y.

FORGINGS, Hollow Bored

Bethlehem Steel Co., Bethlehem, Pa.
 National Forge & Ordnance Co., Irvine, Warren County, Pa.

FORGINGS, Iron and Steel

Bethlehem Steel Co., Bethlehem, Pa.
 National Forge & Ordnance Co., Irvine, Warren County, Pa.

FORGINGS, Upset

Bethlehem Steel Co., Bethlehem, Pa.
 Mueller Brass Co., Port Huron 35, Mich.
 Williams, J. H. & Co., 400 Vulcan St., Buffalo 7, N. Y.

FORMING AND BENDING MACHINES

American Steel Foundries, Elmes Engrg. Div., Paddock Rd., and Tennessee Ave., Cincinnati, Ohio.
 Baldwin-Lima-Hamilton Corp., Eddystone Div., Philadelphia 42, Pa.
 Bethlehem Steel Co., Bethlehem, Pa.
 Chambersburg Engrg. Co., Chambersburg, Pa.
 Cincinnati Milling Mch. Co., Oakley, Cincinnati 9, Ohio.
 Cincinnati Shaper Co., Elam and Garrard Aves., Cincinnati, Ohio.
 Cleveland Punch & Shear Works Co., 3917 St. Clair Ave., N. E., Cleveland, Ohio.
 Consolidated Mch. Tool Corp., Rochester, N. Y.
 Dreis & Krump Mfg. Co., 7416 Loomis Blvd., Chicago 36, Ill.

(Continued on page 478)

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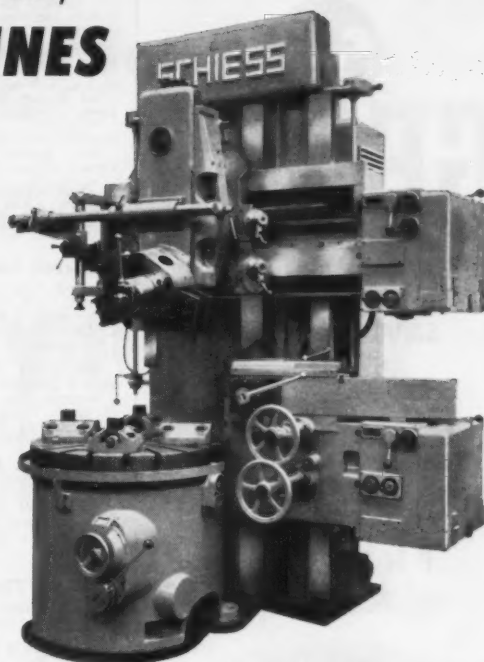
Hydraulic pre-selection of speeds set by handwheel and read on illuminated dial. 16 spindle speeds—ratio 1:50—up to 310 rpm for carbide machining on Model KE 100. Table runs on tapered roller bearings.

Fingertip control for direction of feed and rapid traverse with spring-loaded mono-levers for normal direction plus angular compound feeds. Mono-levers move in same direction as desired feed or traverse movement, simplify correct setting by operator. Specially designed electro-magnetic disc clutches disengage feed instantly with no over-riding or coasting.

Counterbalanced cross rail and side head. Single lever unlocks, raises or lowers, and locks cross rail simultaneously by electro-mechanical controls. *No bolts or nuts to loosen or tighten by hand.*

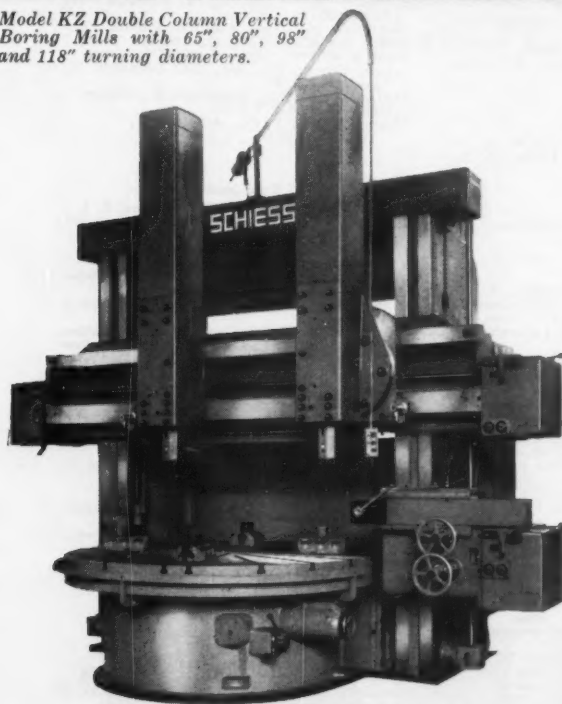
All-vertical gear drive with main motor mounted on back of machine, directly connected to gear box. Changes in direction of drive transmitted to table without bevel gears, eliminating vibration and backlash.

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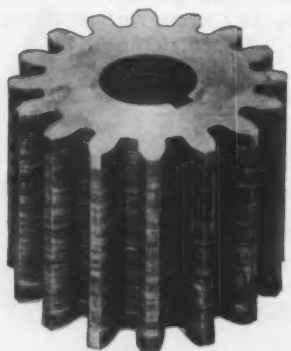
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Lemco Products, Inc., 5490 Dunham Rd., Bed-
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Verson Allsteel Press Co., 93rd St. & S. Ken-
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Wallace Supplies Mfg. Co., 1304-08 Diversey
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Hydopress, Inc., 350 Fifth Ave., New York 1,
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Ampere, N. J.
Verson Allsteel Press Co., 93rd St. & S. Ken-
wood Ave., Chicago, Ill.

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Firth Sterling Inc., 3113 Forbes St., Pittsburgh
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Haynes Stellite Div., Union Carbide & Carbon
Corp., 30 E. 42nd St., New York.
Kennametal, Inc., Latrobe, Pa.
National Broach & Mch. Co., 5600 St. Jean
Ave., Detroit 2, Mich.
Pratt & Whitney, West Hartford 1, Conn.
Wesson Co., 1220 Woodward Heights Blvd.,
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Verson Allsteel Press Co., 93rd St., & S. Ken-
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General Electric Co., Schenectady 5, N. Y.
Westinghouse Electric Corp., E. Pittsburgh, Pa.

FURNITURE, Shop

Standard Pressed Steel Co., Jenkintown, Pa.

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DoAll Co., 254 N. Laurel Ave., Des Plaines, Ill.
Pratt & Whitney, West Hartford 1, Conn.
Scherr, George, Co., Inc., 200 Lafayette St.,
New York 12, N. Y.
Taft-Peirce Mfg. Co., Woonsocket, R. I.
Van Keuren Co., 176 Waltham St., Watertown,
Boston, Mass.

GAGES, Air

Cosa Corp., 405 Lexington Ave., New York 17.
DoAll Co., 254 N. Laurel Ave., Des Plaines, Ill.
Federal Products Corp., P. O. Box 1027, Provi-
dence, R. I.
Pratt & Whitney, West Hartford 1, Conn.
Sheffield Corp., 721 Springfield St., Dayton 1,
Ohio
Taft-Peirce Mfg. Co., Woonsocket, R. I.

GAGES, Comparator

Ames, B. C., Co., Waltham 54, Mass.
Cleveland Instrument Co., 735 Carnegie Ave.,
Cleveland 15, Ohio.
Comtor Co., 47 Farwell St., Waltham 54, Mass.
Cosa Corp., 405 Lexington Ave., New York 17.
DoAll Co., 254 Laurel Ave., Des Plaines, Ill.
Federal Products Corp., P. O. Box 1027, Provi-
dence, R. I.
Jones & Lamson Mch. Co., 160 Clinton St.,
Springfield, Vt.
Pratt & Whitney, West Hartford 1, Conn.
Scherr, George, Co., Inc., 200 Lafayette St.,
New York 12, N. Y.
Sheffield Corp., 721 Springfield St., Dayton 1,
Ohio
Standard Gage Co., Inc., Poughkeepsie, N. Y.
Taft-Peirce Mfg. Co., Woonsocket, R. I.

GAGES, Depth

Ames, B. C., Co., (Dial), Waltham 54, Mass.
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Federal Products Corp., P. O. Box 1027, Provi-
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Hanson-Whitney Co., Div., Whitney Chain Co.,
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Lufkin Rule Co., Hess Ave., Saginaw, Mich.
Millers Falls Co., Greenfield, Mass.
Scherr, George, Co., Inc., 200 Lafayette St.,
New York 12, N. Y.
Sheffield Corp., 721 Springfield St., Dayton 1,
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Standard Gage Co., Inc., Poughkeepsie, N. Y.
Starrett, The L. S., Co., Athol, Mass.
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Lufkin Rule Co., Hess Ave., Saginaw, Mich.
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Sheffield Corp., 721 Springfield St., Dayton 1,
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Starrett, The L. S., Co., Athol, Mass.
Taft-Peirce Mfg. Co., Woonsocket, R. I.

GAGES, Electric

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DoAll Co., 254 Laurel Ave., Des Plaines, Ill.
Federal Products Corp., P. O. Box 1027, Provi-
dence, R. I.
Pratt & Whitney, West Hartford 1, Conn.
Sheffield Corp., 721 Springfield St., Dayton 1,
Ohio

GAGES, Height

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Brown & Sharpe Mfg. Co., Providence, R. I.
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DoAll Co., 254 Laurel Ave., Des Plaines, Ill.
Lufkin Rule Co., Hess Ave., Saginaw, Mich.
Pratt & Whitney, West Hartford 1, Conn.
Scherr, George, Co., Inc., 200 Lafayette St.,
New York 12, N. Y.
Sheffield Corp., 721 Springfield St., Dayton 1,
Ohio
Starrett, The L. S., Co., Athol, Mass.

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Carboloy Dept., General Electric Co., Box 237,
Roosevelt Park Annex, Detroit 32, Mich.
DoAll Co., 254 Laurel Ave., Des Plaines, Ill.
Elgin National Watch Co., Aurora, Ill.
Federal Products Corp., P. O. Box 1027, Provi-
dence, R. I.
Firth Sterling Inc., 3113 Forbes St., Pittsburgh
30, Pa.
Greenfield Tap & Die Corp., Greenfield, Mass.
Haynes Stellite Div., Union Carbide & Carbon
Corp., 30 E. 42nd St., New York.
Kennametal Inc., Latrobe, Pa.
Metal Carbides Corp., Youngstown, Pa.
Pratt & Whitney, West Hartford 1, Conn.
Scherr, George, Co., Inc., 200 Lafayette St.,
New York 12, N. Y.
Sheffield Corp., 721 Springfield St., Dayton 1,
Ohio
Standard Gage Co., Inc., Poughkeepsie, N. Y.
Starrett, The L. S., Co., Athol, Mass.
Taft-Peirce Mfg. Co., Woonsocket, R. I.
Van Keuren Co., 176 Waltham St., Watertown,
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Wiley's Carbide Tool Co., 1340 W. Vernor
Hwy., Detroit 1, Mich.
Woodworth, N. A., Co., 1300 E. Nine Mile Rd.,
Detroit 20, Mich.

GAGES, Surface

Ames, B. C., Co., Waltham 54, Mass.
Brown & Sharpe Mfg. Co., Providence, R. I.
Columbus Die-Tool & Mch. Co., 955 Cleveland
Ave., Columbus, Ohio.
DoAll Co., 254 Laurel Ave., Des Plaines, Ill.
Hanson-Whitney Co., Div., Whitney Chain Co.,
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Lufkin Rule Co., Hess Ave., Saginaw, Mich.
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(Continued on page 480)

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 Greenfield Tap & Die Corp., Greenfield, Mass.
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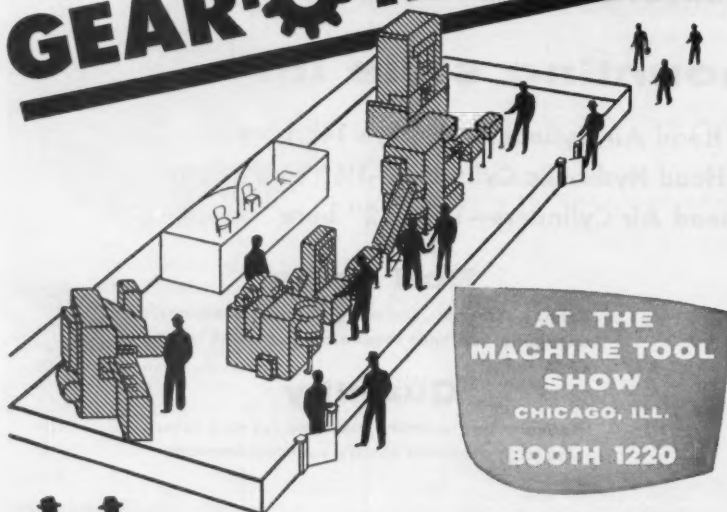
Farrel-Birmingham Co., Inc., 25 Main St., Ansonia, Conn.
 Fellows Gear Shaper Co., 78 River St., Springfield, Vt.
 Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich.

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 Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich.
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(Continued on page 482)

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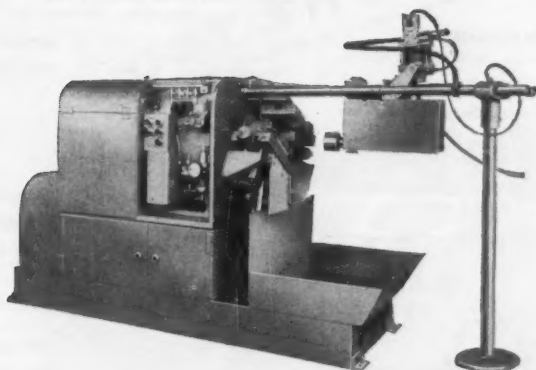
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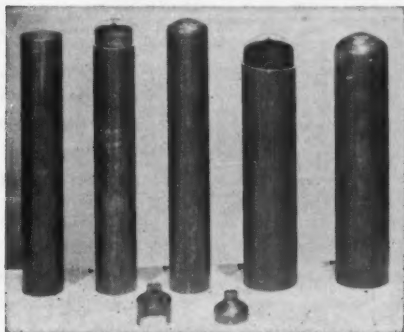


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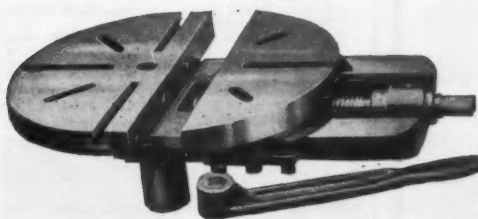
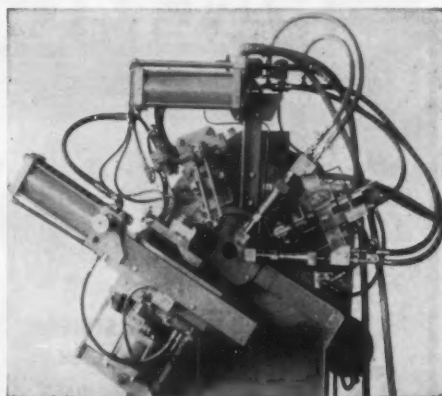
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 Lees-Bradner Co., Cleveland, Ohio

National Broach & Mch. Co., 5600 St. Jean Ave., Detroit 2, Mich.
 Pratt & Whitney, West Hartford 1, Conn.
 Van Norman Co., Springfield, Mass.

GEAR HARDENING MACHINES

Gleason Works, 1000 University Ave., Rochester 3, N. Y.

GEAR LAPPING MACHINES

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 Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich.
 National Broach & Mch. Co., 5600 St. Jean Ave., Detroit 2, Mich.

GEAR MOTORS

See Speed Reducers.

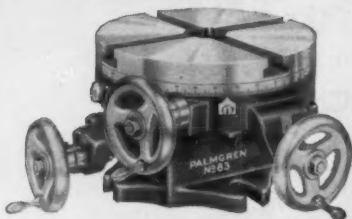
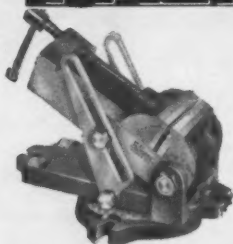
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 National Broach & Mch. Co., 5600 St. Jean Ave., Detroit 2, Mich.

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 Eastman Kodak Co., Rochester, N. Y.
 Farrel-Birmingham Co., Inc., 25 Main St., Ansonia, Conn.
 Fellows Gear Shaper Co., 78 River St., Springfield, Vt.
 Gleason Works, 1000 University Ave., Rochester 3, N. Y.
 Lees-Bradner Co., Cleveland, Ohio
 Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich.
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Automotive Gear Works, Inc., Richmond, Ind.
 Bausch Machine Tool Co., 156 Wason Ave., Springfield 7, Mass.
 Bilgram Gear & Mch. Works, 1217-35 Spring Garden St., Philadelphia, Pa.
 Boston Gear Works, 3200 Main St., North Quincy, Mass.
 Chicago Rawhide Mfg. Co., 1301 Elston Ave., Chicago 22, Ill.
 Cincinnati Gear Co., Wooster Pike and Mariemont Ave., Cincinnati, Ohio.
 Cleveland Worm & Gear Co., 3249 E. 80th St., Cleveland, Ohio.
 Cone-Drive Gears Div., Michigan Tool Co., 7200 E. McNichols Rd., Detroit, Mich.
 Diefendorf Gear Corp., 920 N. Belden Ave., Syracuse, N. Y.
 Fairfield Mfg. Co., 2309 S. Earl Ave., Lafayette, Ind.
 Farrel-Birmingham Co., Inc., 25 Main St., Ansonia, Conn.
 Gear Specialties Inc., 2635 W. Medill Ave., Chicago 47, Ill.
 Greaves Machine Tool Co., 2009 Eastern Avenue, Cincinnati, Ohio.
 Hartford Special Mchry. Co., 287 Homestead St., Hartford, Conn.
 Horsburgh & Scott Co., 5114 Hamilton, Cleveland, Ohio.
 Illinois Gear & Mch. Co., 2120 No. Natchez Ave., Chicago 35, Ill.
 Lees-Bradner Co., Cleveland, Ohio
 Mass. Gear & Tool Co., 36 Nassau St., Woburn, Mass.
 Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich.
 National Broach & Mch. Co., 5600 St. Jean Ave., Detroit 2, Mich.
 New Jersey Gear Mfg. Co., 1470 Chestnut Ave., Hillside, N. J.
 Philadelphia Gear Works, Erie Ave., and G St., Philadelphia, Pa.
 Pittsburgh Gear Co., Neville Island, Pittsburgh 25, Pa.
 Sier-Bath Gear & Pump Co., Inc., 9248 Hudson Blvd., North Bergen, N. J.
 Stahl Gear & Mch. Co., 3901 Hamilton Ave., Cleveland 14, Ohio.
 Vanson Allsteel Press Co., 93rd St. & S. Kenwood Ave., Chicago, Ill.
 Westinghouse Electric Corp., E. Pittsburgh, Pa.
 Williamson Gear & Machine Co., 2606 Martha St., Philadelphia 25, Pa.

GEARS, Rawhide and Non-Metallic

Boston Gear Works, 3200 Main St., North Quincy, Mass.
 Chicago Rawhide Mfg. Co., 1301 Elston Ave., Chicago 22, Ill.
 Cincinnati Gear Co., Wooster Pike and Mariemont Ave., Cincinnati, Ohio.
 Diefendorf Gear Corp., 920 N. Belden Ave., Syracuse, N. Y.
 Gear Specialties Inc., 2635 W. Medill Ave., Chicago 47, Ill.

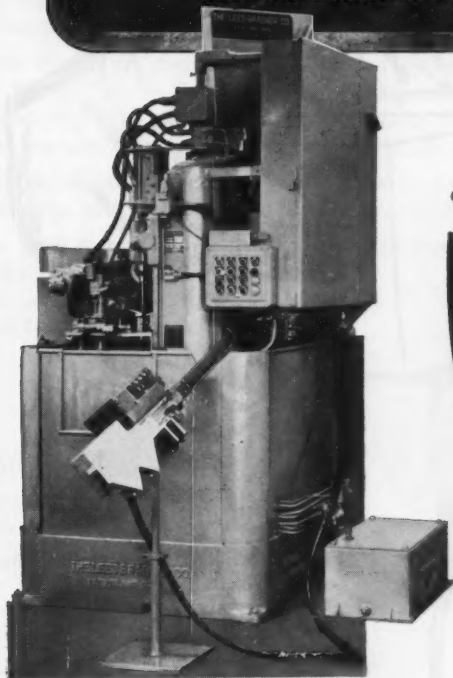
(Continued on page 486)

GET THE **PITCH** ON ...

MACHINES THAT THINK FOR THEMSELVES

AUTOMOTION

ENGINEERED AND DESIGNED BY THE LEES-BRADNER CO. CLEVELAND 11, OHIO



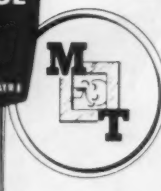
SEE IT IN ACTION AT

THE
MACHINE TOOL
SHOW

CHICAGO, ILL.
SEPT. 6-17, 1955

INTERNATIONAL AMPHITHEATRE

BOOTH 1212



TYPICAL PERFORMANCE DATA

- 3½" diameter, 3 start hob
- Runs at 200 RPM
- Feeds at .050" per revolution
- Hobs two pieces per load
- Hobs two gears every 4 minutes
- 47 teeth in gears
- Face width of gear ¾"
- Loading and unloading time 2 seconds

Here is your chance to see Automation in action . . . The amazing machine that seems to think for itself. Lees-Bradner presents the gear hobbing machine that electronically corrects tolerances while the machine is in operation.

The "Electronic Brain" checks the finished gears as they come from the hobber and makes corrections in pitch diameters or root fillets by shifting the hob between cycles.

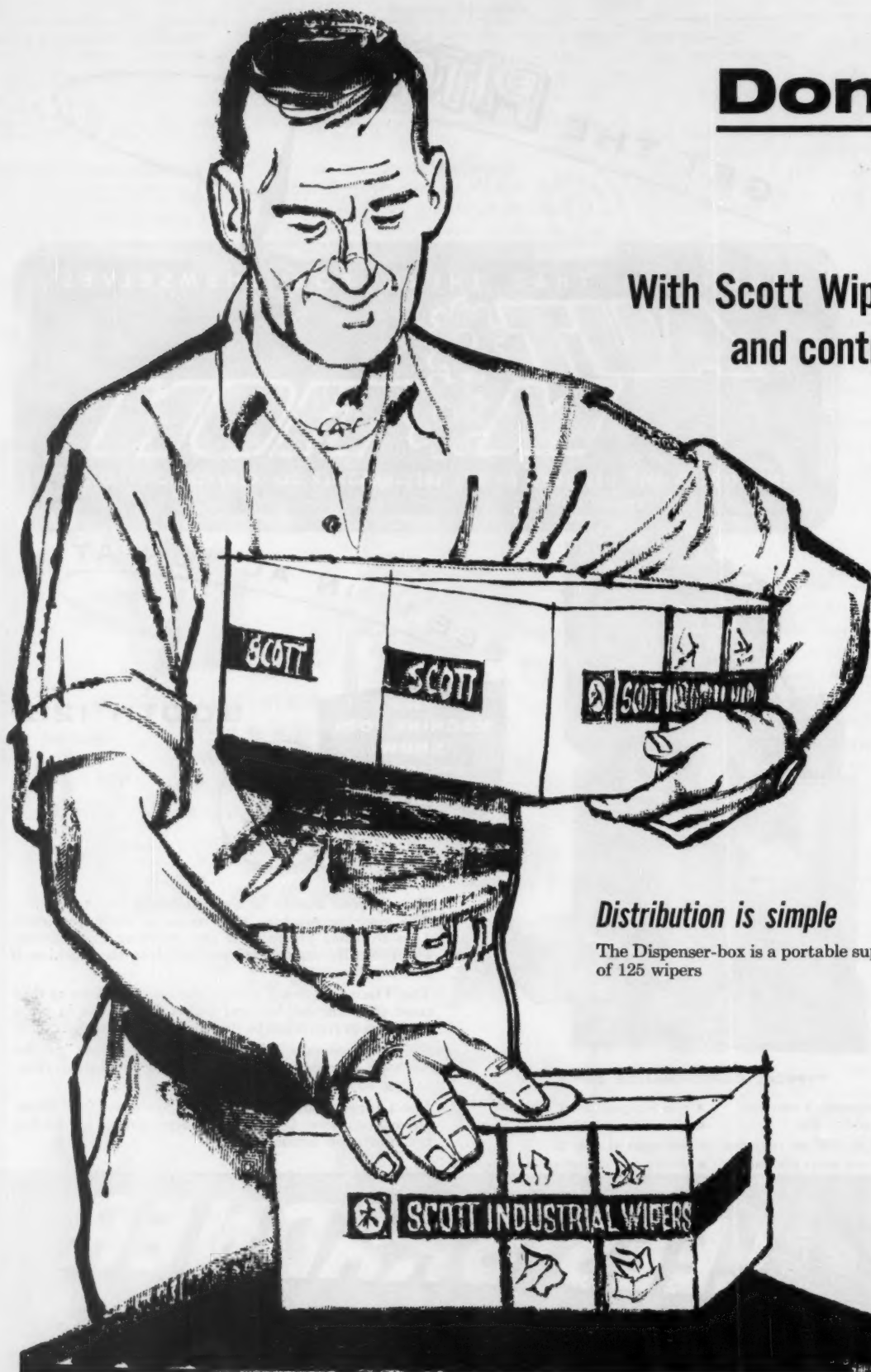
This revolutionary hobber is the reason we say "get the pitch on Automation" . . . the ultimate in efficient, time-saving hobbing.

Don't forget—Booth 1212 at the Machine Tool Show. Or, contact your Lees-Bradner representative who has the "pitch" on Automation.

the **LEES-BRADNER** *Company*
CLEVELAND 11, OHIO • U.S.A.

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and controls . . .**



Distribution is simple

The Dispenser-box is a portable supply
of 125 wipers

waste men and money handling wiping!

you can eliminate expensive handling
• simplify distribution—budget your wiping jobs

Check your wiping operation for these unnecessary expenses—sorting, baling, counting, laundry and laundry shrinkage. Check especially for production time lost when operators leave their machines to get clean wiping material.

Scott Wipers are designed to eliminate these production and profit losses. They're disposable—no more laundering, no sorting or baling. They're packed in dispenser cartons—each worker has a mobile supply of Scott Wipers always at hand.

Compare Scott Wipers with whatever wiping material you're using now—for cost, convenience, performance.

The Scott representative or distributor in your area stands ready to help you set up a production line demonstration. Call him or mail this coupon today.

Absorption is amazing...

"Perf-Embossed"® texture gives Scott Wipers their dirt-gripping, oil-drinking power.



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Disposable!



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 Hartford Special Mchry. Co., 287 Homestead St., Hartford, Conn.
 Horsburgh & Scott Co., 5114 Hamilton, Cleveland, Ohio.
 Philadelphia Gear Works, Erie Ave., and G St., Philadelphia, Pa.
 Pittsburgh Gear Co., Neville Island, Pittsburgh 25, Pa.
 Stahl Gear & Mch. Co., 3901 Hamilton Ave., Cleveland 14, Ohio.
 Westinghouse Electric Corp., E. Pittsburgh, Pa.
 Williamson Gear & Machine Co., 2606 Martha St., Philadelphia 25, Pa.

GENERATORS, Electric

General Electric Co., Schnectady 5, N. Y.
 Lincoln Electric Co. (Arc), 22801 St. Clair Ave., Cleveland, Ohio.
 Reliance Electric & Engrg. Co., 1074 Ivanhoe Rd., Cleveland 10, Ohio.
 Westinghouse Electric Corp., E. Pittsburgh, Pa.

GRADUATING MACHINES

Abrasive Mch. Tool Co., Dexter Rd., E. Providence 14, R. 1.
 Gorton, Geo., Mch. Co., 1110 W. 13th St., Racine, Wis.
 Greaves Machine Tool Co., 2009 Eastern Avenue, Cincinnati, Ohio

GREASE

Cities Service Oil Co., 70 Pine St., New York, N. Y.
 Houghton, E. F., & Co., 303 W. Lehigh Ave., Philadelphia, Pa.
 Lubriplate Div., Fiske Bros. Refining Co., 129 Lockwood St., Newark 5, N. J.
 Shell Oil Co., 50 W. 50th St., New York, N. Y.
 Sinclair Refining Co., 600 5th Ave., New York, N. Y.
 Standard Oil Co. (Indiana), 910 S. Michigan, Chicago, Ill.
 Sun Oil Co., 1608 Walnut St., Philadelphia, Texas Co., 135 E. 42nd St., New York, N. Y.

GRINDERS, Carbide Tool

See Grinding Mches., Carbide Tool

GRINDERS, Die and Mold

Consolidated Mch. Tool Corp., Rochester, N. Y.
 Pratt & Whitney, West Hartford 1, Conn.
 Rivett Lathe & Grinder, Inc., Brighton, Boston 35, Mass.
 Standard Electrical Tool Co., 2488-90 River Rd., Cincinnati, Ohio.

GRINDERS, Oilstone, for Woodworking Tools

Mummert-Dixon Co., Hanover, Pa.

GRINDERS, Pneumatic

Chicago Pneumatic Tool Co., 6 E. 44th St., New York, N. Y.
 Ingersoll-Rand Co., Phillipsburg, N. J.
 Madison-Kipp Corp., Madison, Wis.
 Onsrud Machine Works, Inc., 3940 Palmer St., Chicago, Ill.

GRINDERS, Portable Electric and Toolpost

Chicago Pneumatic Tool Co., 6 E. 44th St., New York, N. Y.
 Millers Falls Co., Greenfield, Mass.
 South Bend Lathe Works, Inc., 425 E. Madison St., South Bend, Ind.
 Standard Electrical Tool Co., 2488-90 River Rd., Cincinnati, Ohio.

GRINDING FIXTURES

Geometric Tool Co., (Die Chaser), Westville Station, New Haven 15, Conn.
 Taft-Peirce Mfg. Co., Woonsocket, R. I.

GRINDING MACHINES, Abrasive Belt

Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit 32, Mich.
 Hill Acme Co., 1201 W. 65th St., Cleveland 2, Ohio.
 Mattison Mch. Works, Rockford, Ill.
 Standard Electrical Tool Co., 2488-90 River Rd., Cincinnati, Ohio.
 Walls Sales Corp., 333 Nassau Ave., Brooklyn 22, N. Y.

GRINDING MACHINES, Bench

Atlas Press Co., Kalamazoo, Mich.
 Gorton, George, Mch. Co., 1110 W. 13th St., Racine, Wis.
 Hardinge Bros., Inc., 1418 College Ave., Elmira, N. Y.
 Millers Falls Co., Greenfield, Mass.
 Rivett Lathe & Grinder, Inc., Brighton, Boston 35, Mass.
 Ryerson, Jos. T., & Son, Inc., 2558 W. 16th St., Chicago 18, Ill.
 Standard Electrical Tool Co., 2488-90 River Rd., Cincinnati, Ohio.
 U. S. Burke Machine Tool Div., Brotherton Rd. 17, Cincinnati 27, Ohio.

GRINDING MACHINES, Broach

Colonial Broach Co., P. O. Box 37, Harper Sta., Detroit 13, Mich.
 Lapointe Mch. Tool Co., 34 Tower St., Hudson, Mass.

GRINDING MACHINES, Camshaft

Landis Tool Co., Waynesboro, Pa.
 Norton Co., 1 New Bond St., Worcester 6, Mass.

GRINDING MACHINES, Carbide Tool

Arter Grinding Mch. Co., 15 Sagamore Rd., Worcester 5, Mass.
 Carboloy Dept., General Electric Co., Box 237, Roosevelt Park Annex, Detroit 32, Mich.
 Cosa Corp., 405 Lexington Ave., New York 17, N. Y.
 DoAll Co., 254 N. Laurel Ave., Des Plaines, Ill.
 Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit 32, Mich.

(Continued on page 490)

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Jigmaster

See It!

BOOTH 418

**compare these specifications:**

| | |
|---------------------|-----------|
| Table Size | 18" x 24" |
| Longitudinal Travel | 20" |
| Cross Travel | 14" |
| Vertical Capacity | 23" |
| Throat | 20" |
| Weight | 7500 Lbs. |

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 3932 West Pine Blvd.

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...the most **Outstanding Advance** in modern precision surface grinding...



THE NEW — ALL ELECTRIC

6" x 18"

Reid-o-matic PRECISION SURFACE GRINDER

FOR BOTH
PRODUCTION
AND
TOOL ROOM
GRINDING

with
PUSH BUTTON CONTROLS
for:

CROSS FEED POWER
RAPID TRAVERSE

RAPID POWER
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TABLE TRAVEL

EXCLUSIVE NEW FEATURES

*Perfected for True Precision
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TABLE SPEED: infinitely variable from 0 to 70
feet per minute

TABLE TRAVEL REVERSAL: new design oper-
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motor reversal

CROSS FEED: instantaneous at either or both
ends of table travel, infinitely
variable from 0 to 7/32" by dial
adjustment (ideal for wheel
dressing)

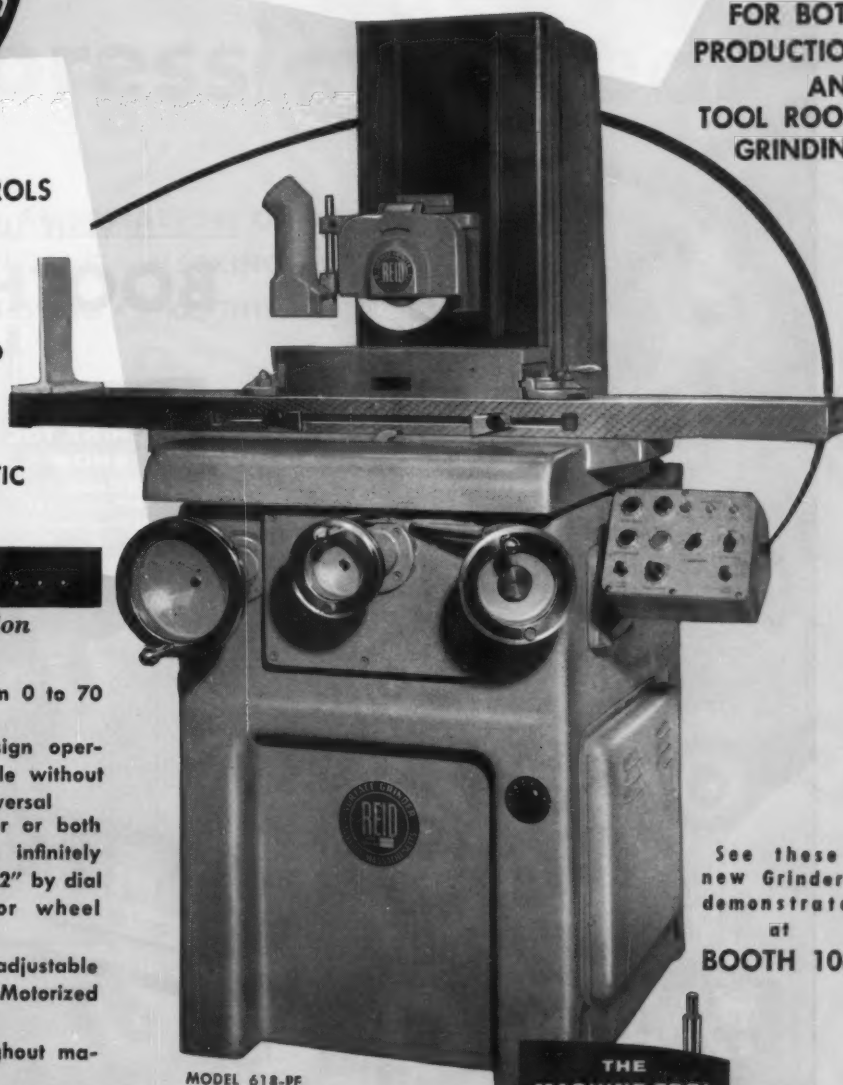
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PLUS 2 OTHER NEW MODELS

MODEL 618PT — Power Driven Table

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MODEL 618-PF

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new Grinders
demonstrated
at
BOOTH 108

THE
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Reid Brothers Company, Inc.



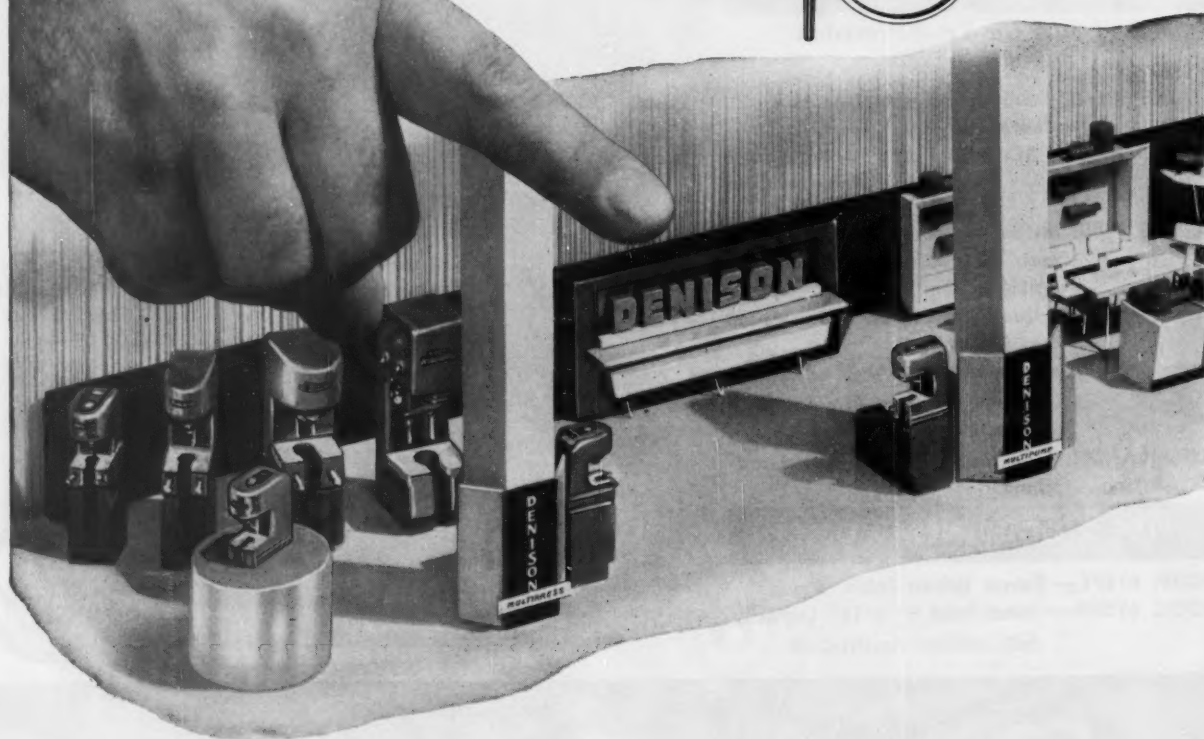
BEVERLY, MASSACHUSETTS



TO FIND to all

VISIT US AT
BOOTH 819

THE
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SEPT. 6-17, 1955
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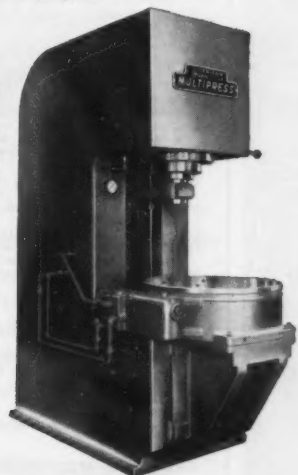


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Wiley's Carbide Tool Co., 1340 W. Vernon Hwy., Detroit 1, Mich.

GRINDING MACHINES, Centerless

Cincinnati Grinders, Inc., Cincinnati, Ohio.
Heald Machine Co., 10 New Bond St., Worcester 6, Mass.
Landis Tool Co., Waynesboro, Pa.
Van Norman Co., Springfield, Mass.

GRINDING MACHINES, Chucking

Baird Machines Co., 1700 Stratford Ave., Stratford, Conn.
Bryant Chucking Grinder Co., 257 Clinton St., Springfield, Vt.
Bullard Co., Brewster St., Bridgeport, Conn.
Landis Tool Co., Waynesboro, Pa.
Lempco Products, Inc., 5490 Dunham Rd., Bedford, Ohio

GRINDING MACHINES, Crankshaft

Landis Tool Co., Waynesboro, Pa.
Lempco Products, Inc., 5490 Dunham Rd., Bedford, Ohio
Norton Co., 1 New Bond St., Worcester 6, Mass.

GRINDING MACHINES, Cylindrical

Arter Grinding Mch. Co., 15 Sagamore Rd., Worcester 5, Mass.
Brown & Sharpe Mfg. Co., Providence, R. I.
Cincinnati Grinders, Inc., Cincinnati, Ohio.
Cosa Corp., 405 Lexington Ave., New York 17, N. Y.
Landis Tool Co., Inc., Waynesboro, Pa.
Lempco Products, Inc., 5490 Dunham Rd., Bedford, Ohio
Norton Co., 1 New Bond St., Worcester 6, Mass.
Rivett Lathe & Grinder Inc., Brighton, Boston 35, Mass.
Sheffield Corp., 721 Springfield St., Dayton 1, Ohio
Van Norman Co., 2640 Main St., Springfield 7, Mass.

GRINDING MACHINES, Die Chaser

Eastern Mch. Screw Corp., New Haven, Conn.
Landis Tool Co., Waynesboro, Pa.

GRINDING MACHINES, Disc

Besley-Welles Corp., 112 Dearborn Ave., Beloit, Wis.
Gardner Machine Co., 414 E. Gardner St., Beloit, Wis.
Lempco Products, Inc., 5490 Dunham Rd., Bedford, Ohio
Mattison Machine Works, Rockford, Ill.
Standard Electrical Tool Co., 2488-90 River Rd., Cincinnati, Ohio.

GRINDING MACHINES, Drill

Gallmeyer & Livingston Co., 336 Straight Ave., S. W. Grand Rapids 4, Mich.
Lehigh Foundries, Inc., 1500 Lehigh Dr., Easton, Pa.
Lempco Products, Inc., 5490 Dunham Rd., Bedford, Ohio
Oliver Instrument Co., 1410 E. Maumee St., Adrian, Mich.
Orban, Kurt & Co., Inc., 205 E. 42nd St., New York 17, N. Y.
Union Twist Drill Co., Athol, Mass.

GRINDING MACHINES, Face

Besley-Welles Corp., 112 Dearborn Ave., Beloit, Wis.
Abrasive Mch. Tool Co., Dexter Rd., E. Providence 14, R. I.
Baird Machine Co., 1700 Stratford Ave., Stratford, Conn.
Cosa Corp., 405 Lexington Ave., New York 17, N. Y.
Hamilton Div. of the Lodge & Shipley Co., Hamilton 1, Ohio
Lempco Products, Inc., 5490 Dunham Rd., Bedford, Ohio
Mattison Machine Works, Rockford, Ill.
Oliver Instrument Co., 1410 E. Maumee St., Adrian, Mich.
Orban, Kurt & Co., Inc., 205 E. 42nd St., New York 17, N. Y.

GRINDING MACHINES, Flexible Shaft

See Flexible Shaft Equipment

GRINDING MACHINES, Gap

Cincinnati Grinders, Inc., Cincinnati, Ohio.
Landis Tool Co., Waynesboro, Pa.

GRINDING MACHINES, Gear Tooth

See Gear Grinding Machines

GRINDING MACHINES For Sharpening Cutters, Reamers, Hobbs, Etc.

Barber-Colman Co., Rock and Montague, Rockford, Ill.
Brown & Sharpe Mfg. Co., Providence, R. I.
Cincinnati Milling Mch. Co., Cincinnati, Ohio.
Cosa Corp., 405 Lexington Ave., New York 17, N. Y.
Fellows Gear Shaper Co., 78 River St., Springfield, Vt.
Gallmeyer & Livingston Co., 336 Straight Ave., S. W. Grand Rapids 4, Mich.
Gleason Works, 1000 University Ave., Rochester 3, N. Y.
Gorton, Geo., Mch. Co., 1110 W. 13th St., Racine, Wis.
Ingersoll Milling Mch. Co., 2442 Douglas St., Rockford, Ill.
Landis Tool Co., Waynesboro, Pa.
LeBlond, R. K., Mch. Tool Co., Madison and Edwards Rds., Cincinnati 18, Ohio.
Norton Co., 1 New Bond St., Worcester 6, Mass.
Oliver Instrument Co., 1410 E. Maumee St., Adrian, Mich.
Onsrud Machine Works, Inc., 3940 Palmer St., Chicago, Ill.
Pratt & Whitney, West Hartford 1, Conn.
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Union Twist Drill Co., Athol, Mass.

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DoAll Co., 254 N. Laurel Ave., Des Plaines, Ill.
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(Continued on page 492)

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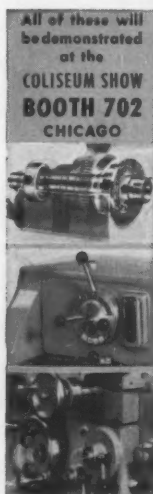
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2. Coliseum MACHINERY SHOW
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3. Production Engineering Show
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Test, for yourself, the performance of these new and
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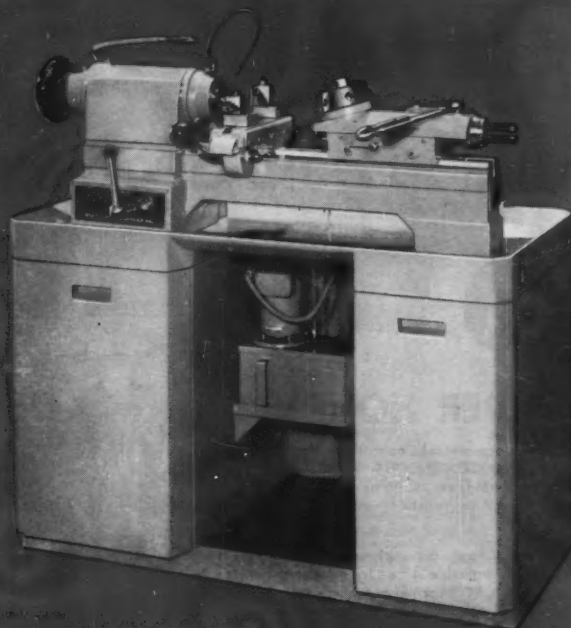
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a challenge to the rated capacity of your present hand turret lathes!

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4. rejects



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 South Bend Lathe Works Inc., 425 E. Madison St., South Bend, Ind.
 Standard Electrical Tool Co., 2488-90 River Rd., Cincinnati, Ohio.
 Walker, O. S., Co., Inc., Worcester, Mass.
 Waltham Machine Works, Newton St., Waltham, Mass.

GRINDING MACHINES, Internal

Abrasive Mch. Tool Co., Dexter Rd., E. Providence 14, R. I.
 Arter Grinding Mch. Co., 15 Sagamore Rd., Worcester 5, Mass.
 Bryant Chucking Grinder Co., 257 Clinton St., Springfield, Vt.
 Cosa Corp., 405 Lexington Ave., New York 17, N. Y.
 Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit 32, Mich.
 Heald Machine Co., 10 New Bond St., Worcester 6, Mass.
 Orban, Kurt & Co., Inc., 205 E. 42nd St., New York 17, N. Y.

Rivett Lathe & Grinder Inc., Brighton, Boston 35, Mass.
 Standard Electrical Tool Co., 2488-90 River Rd., Cincinnati, Ohio.
 Wicaco Mch. Corp., Wayne Junction, Philadelphia, Pa.

GRINDING MACHINES, Jig

Moore Special Tool Co. Inc., 724 Union Ave., Bridgeport, Conn.
 Pratt & Whitney, West Hartford 1, Conn.

GRINDING MACHINES, Knife and Shear Blade

Abrasive Mch. Tool Co., Dexter Rd., E. Providence 14, R. I.
 Hamilton Div. of the Lodge & Shipley Co., Hamilton 1, Ohio
 Hill Acme Co., 1201 W. 65th St., Cleveland 2, Ohio.
 Mattison Machine Works, Rockford, Ill.
 Standard Electrical Tool Co., 2488-90 River Rd., Cincinnati, Ohio.

United States Electrical Tool Div., Emerson Elec. Mfg. Co., 1050 Findlay St., Cincinnati 14, Ohio.

GRINDING MACHINES, Piston Ring

Besley-Welles Corp., 112 Dearborn Ave., Beloit, Wis.
 Gardner Machine Co., 414 E. Gardner St., Beloit, Wis.
 Heald Machine Co., 10 New Bond St., Worcester 6, Mass.
 Mattison Machine Works, Rockford, Ill.
 Standard Electrical Tool Co., 2488-90 River Rd., Cincinnati 4, Ohio.

GRINDING MACHINES, Profile

Baird Machine Co., 1700 Stratford Ave., Stratford, Conn.
 Cosa Corp., 405 Lexington Ave., New York 17, N. Y.
 Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit 32, Mich.
 Orban, Kurt & Co., Inc., 205 E. 42nd St., New York 17, N. Y.
 Sheffield Corp., 721 Springfield St., Dayton 1, Ohio

GRINDING MACHINES, Ring Wheel Ball Race, Etc.

Landis Tool Co., Waynesboro, Pa.
 Van Norman Co., Springfield, Mass.

GRINDING MACHINES, Radial

Consolidated Mch. Tool Corp., Rochester, N. Y.
 Hamilton Div. of the Lodge & Shipley Co., Hamilton 1, Ohio
 Sundstrand Mch. Tool Co., 2531 11th St., Rockford, Ill.

GRINDING MACHINES, Radius, Link

Gardner Machine Co., 414 E. Gardner St., Beloit, Wis.
 Mattison Machine Works, Rockford, Ill.
 Standard Electrical Tool Co., 2488-90 River Rd., Cincinnati 4, Ohio.

GRINDING MACHINES, Roll

Cincinnati Milling Mch. Co., Oakley, Cincinnati 9, Ohio.
 Farrell-Birmingham Co., 25 Main St., Ansonia, Conn.
 Landis Tool Co., Waynesboro, Pa.
 Norton Co., 1 New Bond St., Worcester 6, Mass.

GRINDING MACHINES, Spline Shaft

Van Norman Co., Springfield, Mass.

GRINDING MACHINES, Surface

Abrasive Mch. Tool Co., Dexter Rd., E. Providence 14, R. I.
 Arter Grinding Mch. Co., 15 Sagamore Rd., Worcester 5, Mass. (Rotary)
 Baird Machine Co., 1700 Stratford Ave., Stratford, Conn.
 Besley-Welles Corp., 112 Dearborn Ave., Beloit, Wis.
 Blanchard Machine Co., 64 State St., Cambridge, Mass.
 Brown & Sharpe Mfg. Co., Providence, R. I.
 Cincinnati Milling Mch. Co., Oakley, Cincinnati 9, Ohio.
 DoAll Co., 254 N. Laurel Ave., Des Plaines, Ill.
 Gardner Machine Co., 414 E. Gardner St., Beloit, Wis.
 Galmeyer & Livingston Co., 336 Straight Ave., S. W., Grand Rapids 4, Mich.
 Hamilton Div. of the Lodge & Shipley Co., Hamilton 1, Ohio
 Heald Machine Co., 10 New Bond St., Worcester 6, Mass.
 Hill Acme Co., 1201 W. 65th St., Cleveland 2, Ohio.
 Lempeco Products, Inc., 5490 Dunham Rd., Bedford, Ohio
 Mattison Machine Works, Rockford, Ill.
 Norton Co., 1 New Bond St., Worcester 6, Mass.
 Orban, Kurt & Co., Inc., 205 E. 42nd St., New York 17, N. Y.
 Pratt & Whitney, West Hartford 1, Conn.
 Reid Bros. Co., Inc., Beverly, Mass.
 Sheffield Corp., 721 Springfield St., Dayton 1, Ohio
 Standard Electrical Tool Co., 2488-90 River Rd., Cincinnati 4, Ohio.
 Taft-Peirce Mfg. Co., Woosocket, R. I.
 Thompson Grinder Co., 1500 W. Main St., Springfield, Ohio.
 Walker, O. S., Co., Inc., Worcester, Mass.

GRINDING MACHINES, Tap

Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit 32, Mich.
 Jones & Lamson Mch. Co., 160 Clinton St., Springfield, Vt.

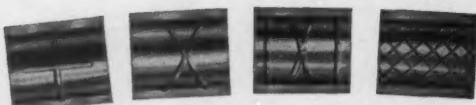
(Continued on page 494)

High Speed

CONTINUOUS OIL GROOVING

500

PIECES PER HOUR!



High-production and economical operation are the features of the WICACO CONTINUOUS OIL GROOVER . . . capable of completing as many as 500 grooved pieces per hour in routine practice—even with unskilled labor!

The operator loads and unloads the work **without stopping the Machine**—a valuable time-saving advantage made possible by the WICACO upright construction of the spindle and stationary chuck. Feed-lever automatically returns to neutral position when cutting tool reaches its proper depth. The spindle—not the chuck—revolves, permitting fast and convenient grooving of a variety of larger and irregular work. Maximum depth of groove 7/32", maximum width 3/8", grooves may be cut in work from 1/4" I.D. to 4 1/2" I.D.; standard chuck holds work to 4 1/2" O.D.; stroke of spindle from 0" to 7"; floor space 24" dia.; weight of machine about 950 lbs.

Send us sample bearings to cut to specifications. We will return them, properly grooved, with a record of the time required and a cost-estimate. No obligation. Or, write for detailed, well-illustrated Bulletin.



WICACO

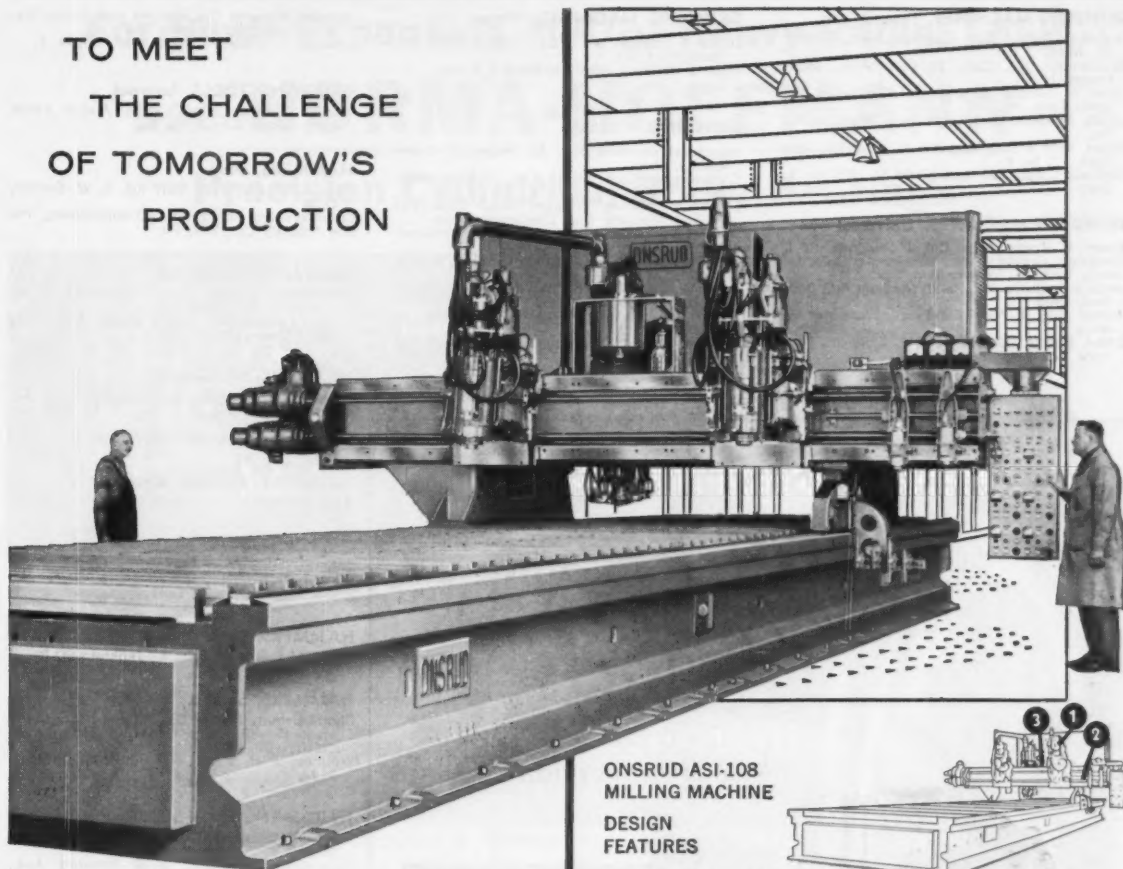
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THE WICACO MACHINE CORPORATION

WAYNE JUNCTION

PHILADELPHIA 44, PA.

TO MEET
THE CHALLENGE
OF TOMORROW'S
PRODUCTION



85 TONS OF AUTOMATIC PRECISION

First build the new concept and from this, the machine. Out of such thinking have come astonishing new machines . . . like the machine shown here for milling aluminum billets and plate up to nine feet wide and forty feet long. Built for the Air Force to Boeing specifications, the new Onsrud ASI-108 automatically mills contours and angular planes under electronic tracer control . . . or performs massive profiling operations with its synchronized tri-feed Onsrud InvOmil head. The ASI-108 is but one of many high speed Onsrud machines for milling aluminum and related metals in any size or type of part. If you'll write we'll be delighted to send you the Onsrud brochure, "Onsrud machines for Aluminum Milling."

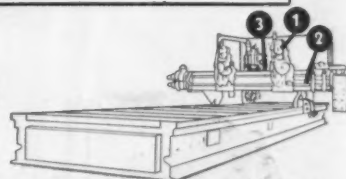
ONSRUD MACHINE WORKS INC.
7716 Lehigh Avenue • Niles, Illinois



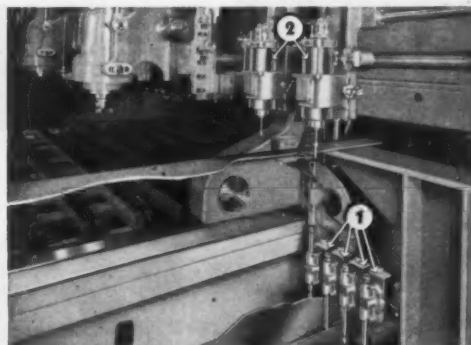
Onsrud

For more information on products advertised, use Inquiry Card, page 325

ONSRUD ASI-108 MILLING MACHINE DESIGN FEATURES



- ① 60 HP liquid cooled milling heads. Automatically tilt up to 10°, raise and lower, and feed on cross slide under electronic tracer control.
- ② Overhead carriage travels along bed at variable speeds for longitudinal feed of cutter heads.
- ③ Onsrud InvOmil profile milling head . . . provides synchronized transverse, longitudinal and rotary feeds for high speed heavy duty profiling.
- ④ Overall dimensions . . . 24' wide x 50' long x 12' high.



Close-up view of electronic tracer heads. Lower four tracing heads (1) control rise, fall and angular motion of the vertical milling heads. Two upper tracing heads (2) control transverse movement of the milling heads on cross slide. A total of 28 possible motions of the milling heads may be established in one set-up under electronic tracer control.

FOR DOING THINGS BETTER BY DOING THINGS DIFFERENTLY

MACHINERY, September, 1955—493

GRINDING MACHINES, Thread

Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit 32, Mich.
 Hirschmann Co., Carl, 30 Park Ave., Manasset, N. Y.
 Jones & Lamson Mch. Co., 160 Clinton St., Springfield, Vt.
 Landis Machine Co. (Centerless), Waynesboro, Pa.
 Orban, Kurt & Co., Inc., 205 E. 42nd St., New York 17, N. Y.
 Sheffield Corp., 721 Springfield St., Dayton 1, Ohio

GRINDING MACHINES, Universal

Brown & Sharpe Mfg. Co., Providence, R. I.
 Cincinnati Grinders, Inc., Cincinnati, Ohio.
 Landis Tool Co., Waynesboro, Pa.
 Lemco Products, Inc., 5490 Dunham Rd., Bedford, Ohio
 Norton Co., 1 New Bond St., Worcester 6, Mass.
 Orban, Kurt & Co., Inc., 205 E. 42nd St., New York 17, N. Y.

GRINDING MACHINES, Worm

Jones & Lamson Mch. Co., 160 Clinton St., Springfield, Vt.
 Pratt & Whitney, West Hartford 1, Conn.

GRINDING WHEELS

Blanchard Machine Co., 64 State St., Cambridge, Mass.
 Carborundum Co., Buffalo Ave., Niagara Falls, N. Y.
 Cincinnati Milling Products Div., Cincinnati Milling Machine Co., Cincinnati, Ohio.
 DoAll Co., 254 N. Laurel Ave., Des Plaines, Ill.
 Gardner Machine Co. (Surface Grinder), 414 E. Gardner St., Beloit, Wis.
 Macklin Co., 2925 Wildwood Ave., Jackson, Mich.
 Norton Co., 1 New Bond St., Worcester 6, Mass.
 Precision Diamond Tool Co., 102 South Grove Ave., Elgin, Ill.

Simonds Abrasive Co., Tacony and Fraley Sts., Bridesburg, Philadelphia, Pa.
 Smit, J. K. & Sons, Inc., Murray Hill, N. J.

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Waldes Kohinoor, Inc., 4716 Austel Place, Long Island City 1, N. Y.

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 Chambersburg Engrg. Co., Chambersburg, Pa.
 Erie Foundry Co., Erie, Pa.

HAMMERS, Forging Air

Chambersburg Engrg. Co., Chambersburg, Pa.
 Erie Foundry Co., Erie, Pa.
 Lobdell United Div., United Engrg. & Foundry Co., Wilmington 99, Del.

HAMMERS, Pneumatic

Chambersburg Engrg. Co., Chambersburg, Pa.
 Chicago Pneumatic Tool Co., 6 E. 44th St., New York, N. Y.
 Ingersoll-Rand Co., Phillipsburg, N. J.

HAMMERS, Portable Electric

Millers Falls Co., Greenfield, Mass.

HAMMERS, Power

Chambersburg Engrg. Co., Chambersburg, Pa.
 Lobdell United Div., United Engrg. & Foundry Co., Wilmington 99, Del.

HAMMERS, Shaft

Standard Pressed Steel Co., Jenkintown, Pa.

HAMMERS, Soft

Chambersburg Engrg. Co., Chambersburg, Pa.
 Chicago Rawhide Mfg. Co., 1301 Elston Ave., Chicago 22, Ill.
 Williams, J. H. & Co., 400 Vulcan St., Buffalo 7, N. Y.

HARDENING EQUIPMENT

Gleason Works, 1000 University Ave., Rochester, N. Y.
 Ohio Crankshaft Co., 3800 Harvard Ave., Cleveland, Ohio.

HARDENING MACHINES, Flame

Cincinnati Milling Machine Co., Cincinnati, Ohio.
 Gleason Works, 1000 University Ave., Rochester, N. Y.

HARDNESS TESTING INSTRUMENTS

Olsen, Tinius, Testing Mch. Co., Willow Grove, Pa.
 Scherr, George Co., Inc., 200 Lafayette St., New York 12, N. Y.
 Shore Instrument & Mfg. Co., Van Wyck Ave., and Carl St., Jamaica, N. Y.
 Wilson Mechanical Instrument Co., Inc., 230-D Park Ave., New York, N. Y.

HEADING MACHINES

National Machinery Co., Greenfield and Stanton Sts., Tiffin, Ohio.

HOBBIING MACHINES

See Gear Cutting Machines, Spur and Helical Gears (Hobbing), and Gear Cutting Machines, Worm and Worm Wheels.

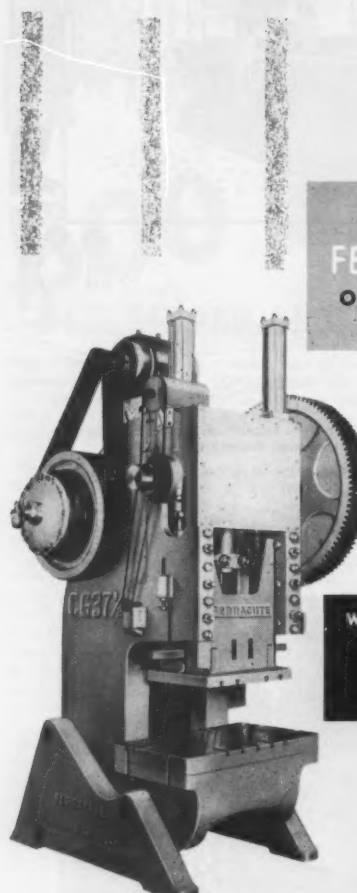
HOBBS

Barber-Colman Co., Rock and Montague, Rockford, Ill.
 Brown & Sharpe Mfg. Co., Providence, R. I.
 Lees-Bradner Co., Cleveland, Ohio
 Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich.
 National Twist Drill & Tool Co., Rochester, Mich.
 New Jersey Gear & Mfg. Co., 1470 Chestnut Ave., Hillside, N. J.
 Union Twist Drill Co., Athol, Mass.

HOIST HOOKS

Bethlehem Steel Co., Bethlehem, Pa.
 Williams, J. H. & Co., 400 Vulcan St., Buffalo 7, N. Y.

(Continued on page 496)



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BUILT TO JIC STANDARDS

With air-powered, electrically controlled
"L.K." style FRICTION CLUTCH
with interconnected brake and
single-point adjustment . . .

and box-type ram

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Complete specifications on
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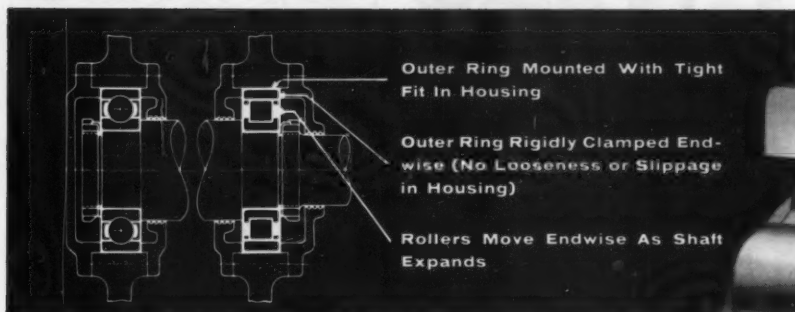
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use **NORMA-HOFFMANN**
Precision Cylindrical Roller Bearings**

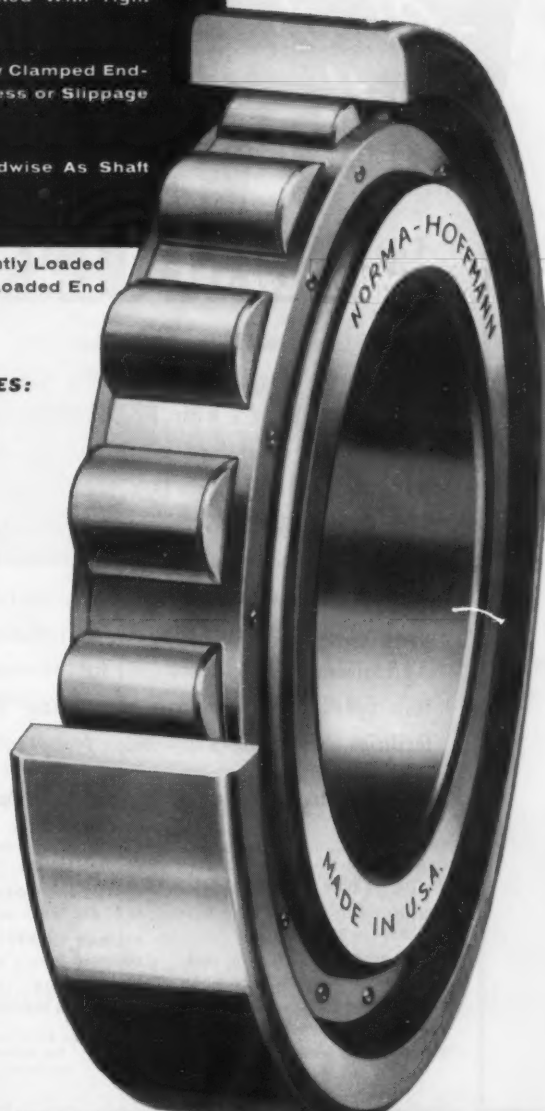


Typical Mounting Using Clamped Ball Bearing At Lightly Loaded End Of Shaft And Clamped Roller Bearing At Heavily Loaded End

CHECK THESE ROLLER BEARING ADVANTAGES:

1. No Looseness Required Between Outer Ring and Housing — As With Self-Contained Bearings.
2. No Possibility of Endwise Cramping of Bearings — A Frequent Cause of Heating and Early Failure.
3. Extra Quiet and Trouble Free Operation — Due to Elimination of Looseness.
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6. Interchangeable With Standard Single Row Metric Ball Bearings.
7. Available Also in An Extra Light Series Where Overall Weight Is Important.

Norma-Hoffmann Engineers, specialists in bearing design and application, will help you with your problems. Ask for their services.



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Precision **BEARINGS**
BALL • ROLLER • THRUST

NORMA-HOFFMANN BEARINGS CORPORATION
STAMFORD, CONNECTICUT - FOUNDED IN 1911

FIELD OFFICES: Atlanta, Chicago, Cincinnati, Cleveland, Dallas, Denver, Detroit, Kansas City, Los Angeles, San Francisco, Seattle

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FAIRFIELD!

If you use gears in the product you make, we believe it will pay you, as it has others, to become acquainted with FAIRFIELD—the place where fine gears are produced to meet your specifications EFFICIENTLY, ECONOMICALLY! Fairfield's production facilities are unexcelled for making all kinds of accurate, automotive type gears such as are now finding wide use in all branches of industry: for Tractors, Trucks, and Buses . . . for Agricultural Implements . . . for Machine Tools. Ask for latest literature describing Fairfield's facilities. *Your inquiry will receive prompt attention.*

Fine Gears Made to Order

SPUR GEARS—Straight, helical, and internal. Sizes from 16 pitch, 1½" dia., to 1½ pitch, 36" dia.

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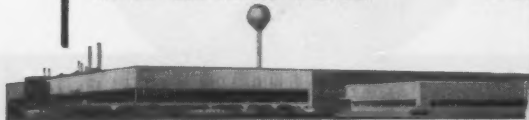
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SPLINED SHAFTS—Lengths to 32". Diameters from 1" to 6".

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Ingersoll-Rand Co., Phillipsburg, N. J.

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Philadelphia Gear Works Inc., Erie Ave. and G St., Philadelphia, Pa.

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Sunnen Products Co., 7900 Manchester Ave., St. Louis 17, Mo.

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Barnes, W. F. & John, Co., 201 S. Water St., Rockford, Ill.
Fulmer, C. Allen, Co., 1231 First National Bank Bldg., Cincinnati 2, Ohio
Lempco Products, Inc., 5490 Dunham Rd., Bedford, Ohio
Micromatic Hone Corp., 8100 Schoolcraft, Detroit 4, Mich.
Moline Tool Co., 102 20th St., Moline, Ill.
Snyder Tool & Engrg. Co., 3400 E. Lafayette, Detroit 7, Mich.
Sunnen Products Co., 7900 Manchester Ave., St. Louis 17, Mo.

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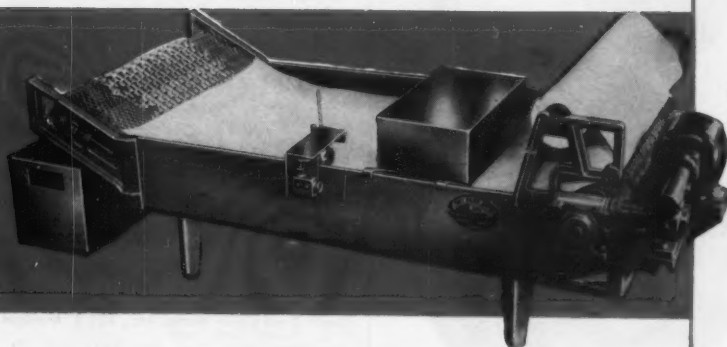
American Steel Foundries, Elmes Engrg. Div., Paddock Rd. and Tennessee Ave., Cincinnati, Ohio
Baldwin-Lima-Hamilton Corp., Eddystone Div., Philadelphia 42, Pa.
Baldwin-Lima-Hamilton Corp., Lima Hamilton Div., Hamilton, Ohio
Barnes Drill Co., 814 Chestnut St., Rockford, Ill.
Barnes, John S. Corp., Rockford, Ill.
Bethlehem Steel Corp., Bethlehem, Pa.
Birdsboro Steel Fdry. & Mch. Co., Birdsboro, Pa.
Bliss, E. W., Co., 1375 Raff Rd., S. W., Canton, Ohio
Chambersburg Engrg. Co., Chambersburg, Pa.
Colonial Broach Co., P.O. Box 37, Harper Sta., Detroit 13, Mich.
Cross Co., 3250 Bellevue Ave., Detroit 7, Mich.
Denison Engrg. Co., 1160 Dublin St., Columbus 16, Ohio
Erie Foundry Co., Erie, Pa.
Hannifin Corp., 501 S. Wolf Rd., Des Plaines, Ill.
Hydraulic Press Mfg. Co., 300 Lincoln Ave., Mt. Gilead, Ohio
Hydro-Line Mfg. Co., 5764 Pike Rd., Rockford, Ill.
Hydropress, Inc., 350 Fifth Ave., New York 1, N. Y.
Lake Erie Engrg. Corp., Kenmore Station, Buffalo, N. Y.

(Continued on page 498)

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To get more efficient assembly of an end head on a fractional horsepower motor, a leading automotive parts manufacturer came to Federal. The result — a standard Federal Bench Type Projection Welder with a special 8 station dial feed operated through a Geneva motion drive that completes 1600 assemblies per hour.

Federal uses a Reeves drive arrangement operating through a gear box to permit flexibility of adjustment of indexing rate. The die slide is spring loaded to insure identical weld force at each station. The manufacturer finds this welder gives a more uniform motor end head, in greater quantities, at reduced costs.

This is another example of how Federal's resistance welding "know how" is paying dividends to one of America's leading industrial concerns. Why not, when next you're considering welding, call Federal — First in Resistance Welding.

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Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit 32, Mich.
Hannifin Corp., 501 S. Wolf Rd., Des Plaines, Ill.
Hartford Special Machinery Co., 287 Homestead Ave., Hartford 12, Conn.
Hydraulic Press Mfg. Co., 300 Lincoln Ave., Mt. Gilead, Ohio
Oilgear Co., 1569 W. Pierce St., Milwaukee, Wis.
Rivett Lathe & Grinder, Inc., Brighton, Boston 35, Mass.
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Young Mch. Tool Div., Church Rd., Bridgeport, Pa.

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Abrasive Mch. Tool Co., Dexter Rd., E. Providence 14, R. I.
Brown & Sharpe Mfg. Co., Providence, R. I.
Cincinnati Milling Mch. Co., Oakley, Cincinnati 9, Ohio
Hartford Special Mchry. Co., 287 Homestead St., Hartford, Conn.
Knight, W. B., Machine Co., St. Louis, Mo.
Nichols-Morris Corp., 76 Mamaroneck Ave., White Plains, N. Y.
Rockford Machine Tool Co., 2500 Kishwaukee St., Rockford, Ill.
Scherr, George, Co., Inc., 200 Lafayette St., New York 12, N. Y.
South Bend Lathe Works, Inc., 425 E. Madison St., South Bend, Ind.
Sundstrand Mch. Tool Co., 2531 11th St., Rockford, Ill.
Swanson Tool & Machine Products, Inc., 854 E. 8th St., Erie, Pa.
Taft-Peirce Mfg. Co., Woonsoket, R. I.
Zagar Tool, Inc., 24000 Lakeland Blvd., Cleveland 23, Ohio

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DoAll Co., 254 N. Laurel Ave., Des Plaines, Ill.
Federal Products Corp., P.O. Box 1027, Providence, R. I.
Lufkin Rule Co., Hess Ave., Saginaw, Mich.
Scherr, George, Co., Inc., 200 Lafayette St., New York 12, N. Y.
Standard Gage Co., Inc., Poughkeepsie, N. Y.
Starrett, The L. S., Co., Athol, Mass.

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Brown & Sharpe Mfg. Co., Providence, R. I.
Scherr, George, Co., Inc., 200 Lafayette St., New York 12, N. Y.
Starrett, The L. S., Co., Athol, Mass.

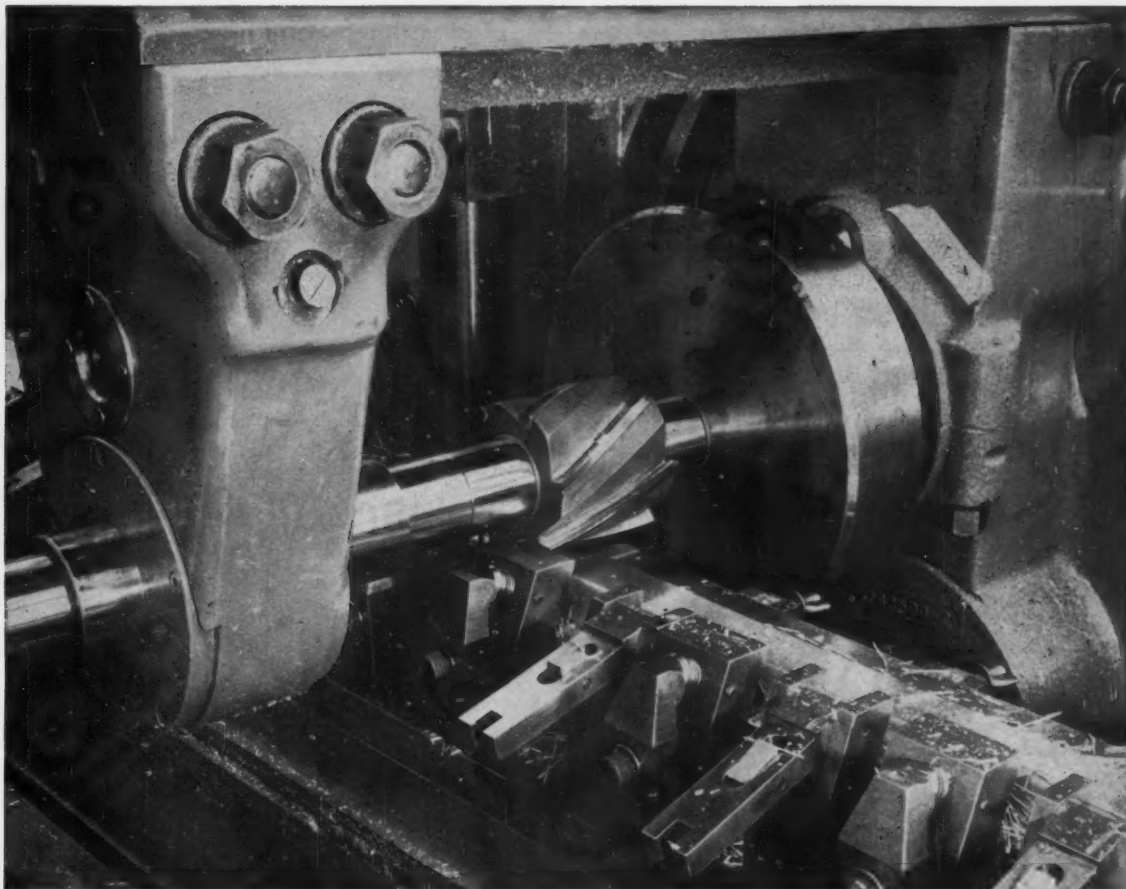
INDICATORS, Test

Ames, B. C., Waltham 54, Mass.
Brown & Sharpe Mfg. Co., Providence, R. I.
Cleveland Instrument Co., 735 Carnegie Ave., Cleveland 15, Ohio
Federal Products Corp., P.O. Box 1027, Providence, R. I.
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Scherr, George, Co., Inc., 200 Lafayette St., New York 12, N. Y.
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(Continued on page 502)



Grumman Tool Engineers report:

Cougar tail part milled five times faster with "Helicarb" Helical Carbide Slab Mills

Grumman Tool Engineers were quick to recognize the advantages of "Helicarb" Helical Carbide Milling Cutters. The faster speeds and feeds, better finishes, more parts per grind, and longer tool life possible with these new cutters have resulted in greatly increased production and lower costs.

For example, take the part shown under the cutter in the above photograph. It is a cap strip for the tail section of the F9F "Cougar," a speedy jet fighter manufactured for the U. S. Navy. Switching to "Helicarb" Helical Carbide Slab Mills enabled the table feed to be increased *five times*, reducing cycle time to only 1/5 of what it was previously.

Finishes of 20-25 r.m.s.

To get the best possible finish on the part, vibration was dampened by mounting a flywheel on the arbor. The

combination of "Helicarb" cutter and flywheel produced a finish of 20-25 r.m.s., reducing hand work to a minimum and thus further lowering the cost of the part.

Amazingly efficient flute design

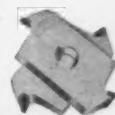
The secret of the "Helicarb" Cutter is its highly efficient tooth design. A true helical flute is combined with the edge hardness of a one-piece carbide tip. The result is a husky, heavy-duty cutter that is unmatched for heavy stock removal.

Available in variety of models

Helicarb Cutters are now available as standards in a variety of models and sizes for both non-ferrous and steel applications. A catalog giving full details is yours for the asking. Write to Sonnet Tool & Mfg. Co., 575 No. Prairie Avenue, Hawthorne, California.



END MILLS



INTERLOCKING SIDE
OR STRADDLE MILLS



SHELL-END
MILLS



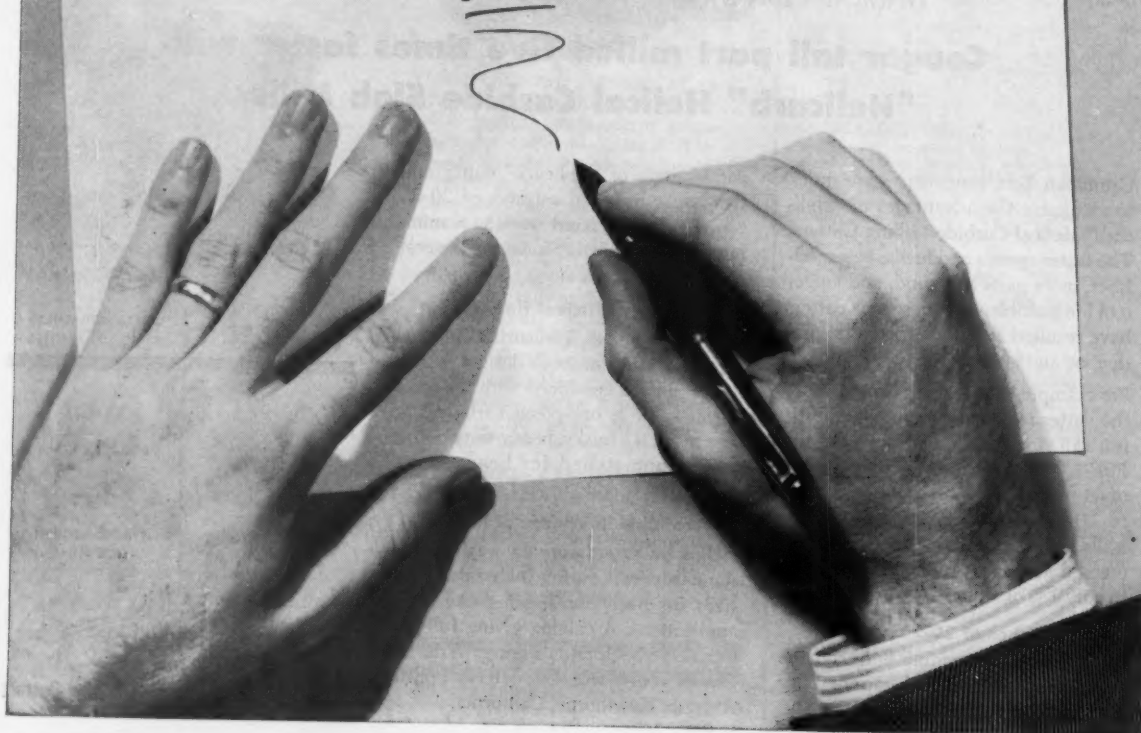
STAGGER-TOOTH
SIDE MILLS



"Helicarb" Helical Carbide Milling Cutters

doesn't this make good sense to you...

The same **HOUGHTON PRODUCTS** that
perform so well in *machine tools*
operated at the Show will also
work to best advantage
in *your* plant!



As a machine tool operator you have one thing in common with the machine tool manufacturer:

You both want the most efficient performance you can get!

So it *does* make sense to use the same high quality Houghton lubes, greases, coolants, cleaners and rust preventives used by so many exhibitors at the Machine Tool Show.

All you need do to benefit from these same products is to *try them!* You'll also like the experienced on-the-job service you get.

See the Houghton Man at Booth 318 or write for bulletins, to E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.

These Products will Make Sense in Your Shop, too!

COOLANTS AND CUTTING OILS *for dependable metal cutting*

Houghton supplies a complete line of water soluble coolants compounded and fortified to provide maximum production, outstanding tool life and the finish you want. You can be sure of getting every possible unit of production from your machines with Houghton cutting fluids.

"HOUGHTO-GRIND" *for most efficient oil-free grinding*

This oil-less grinding compound is rust-inhibitive when mixed with high dilutions of water. There's no oil to separate and load up wheels, so glazing and grinding checks are eliminated. Low-cost, too, in dilutions up to 200 parts water.

"WAY LUBRICANTS" *that won't "slip-stick"*

Chatter, galling and excessive wear of machine ways are eliminated when Houghton Way Lubricants are on the job. They are high in lubricating properties and low in friction. They provide high film strength and a marked affinity for metal. You can smooth-out the operation of your machine tools with Houghton Way Lubricants.

"HOUGHTO-CLEAN" *for cold cleaning of metals*

Room temperature metal cleaning compounds for production lines; make costly heating equipment unnecessary, keeps department cooler, worker morale higher, cleaning costs down, safe and effective.

"HYDRO-DRIVE" *Fortified Hydraulic Oil*

Hydro-Drive has everything a hydraulic oil needs: selective viscosity for efficient operation and high viscosity index; high film strength that prevents wear; oxidation stability that keeps it on the job for years and contains solvent properties that keep the system clean.

HOUGHTON "RUST-VETO" *for maximum rust prevention*

From indoor corrosion protection of highly finished parts to outdoor rust prevention for machinery and dies, RUST-VETO was first in the field—and still is. A wide range to meet industrial and government "specs".

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Ready to give you
on-the-job service . . .



SEE HOUGHTON'S HYDRAULIC
DISPLAY AT THE SHOW—
OILS, FLUIDS, ADDITIVES
AND PACKINGS
BOOTH **318**



Based on past performance records, one of the nation's leading steel producers specified an H & S RD-4000-H Herringbone Speed Reducer to drive the tension reel on their new 26 inch skin pass mill for cold finishing stainless steel.

This is just another example of the reliable engineering construction and quality built into every H & S speed reducer whether it is a Worm Gear, Helical or Herringbone type. Self-lubricated, they are simply but ruggedly constructed for long-lived efficiency. They permit the use of standard, high-speed motors that are more efficient and economical.

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GEARS AND SPEED REDUCERS

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INTENSIFIERS, Hydraulic

Baldwin-Lima-Hamilton Corp., Eddystone Div., Philadelphia 42, Pa.
Hydraulic Press Mfg. Co., 300 Lincoln Ave., Mt. Gilead, Ohio
Hydro-Line Mfg. Co., 5764 Pike Rd., Rockford, Ill.
Hydropress, Inc., 350 Fifth Ave., New York 1, N. Y.

JACKS, Machine Leveling

Enterprise Mch. Parts Corp., Detroit, Mich.

JACKS, Planer

Armstrong Bros. Tool Co., 5200 W. Armstrong Ave., Chicago, Ill.

JIG BORER

See Boring Machines, Jig

JIGS AND FIXTURES

Columbus Die, Tool & Mch. Co., 955 Cleveland Ave., Columbus, Ohio
Hartford Special Mchry. Co., 287 Homestead St., Hartford, Conn.
Ingersoll Milling Machine Co., 2442 Douglas St., Rockford, Ill.
Logansport Machine Co., Inc., 810 Center Ave., Logansport, Ind.
Millholland, W. K., Machinery Co., 6402 Westfield Blvd., Indianapolis 5, Ind.
National Broach & Machine Co., 5600 St. Jean St., Detroit 13, Mich.
Sheffield Corp., 721 Springfield St., Dayton 1, Ohio
Snow Mfg. Co., 435 Eastern Ave., Bellwood, Ill.
Sundstrand Machine Tool Co., 2531 11th St., Rockford, Ill.
Taft-Peirce Mfg. Co., Woonsocket, R. I.
Woodworth, N. A., Co., 1300 E. Nine Mile Rd., Detroit 20, Mich.

JOINTS

See Fittings, Hydraulic, Pneumatic, Etc.

KEYS, Woodruff, Machine, Special

Standard Automotive Parts Co., 660-668 Nims St., Muskegon, Mich.

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Baker Bros., Inc., Station F, P.O. Box 101, Toledo 10, Ohio
Consolidated Mch. Tool Co., Rochester, N. Y.
Davis Keyseater Co., 405 Exchange St., Rochester 8, N. Y.
Lapointe Machine Tool Co., 34 Tower St., Hudson, Mass.
Mitts & Merrill, 68 Holden St., Saginaw, Mich.
Morton Mfg. Co., Muskegon Heights, Mich.

KNURL HOLDERS

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Pratt & Whitney, West Hartford 1, Conn.

KNURLING TOOLS

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Pratt & Whitney, West Hartford 1, Conn.
Reed Rolled Thread Die Co., P.O. Box 350, Worcester 1, Mass.
Williams, J. H. & Co., 400 Vulcan St., Buffalo 7, N. Y.

LAPPING MACHINES

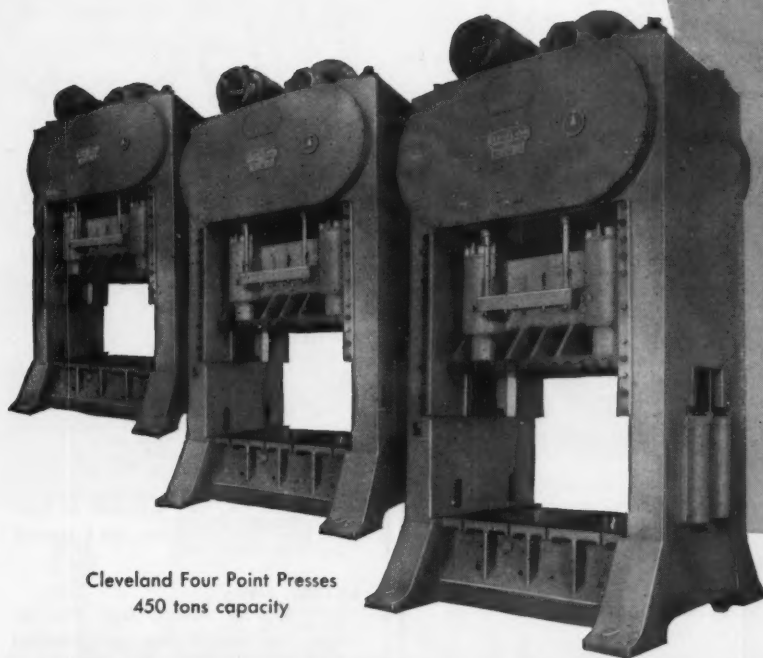
Barnes Drill Co. (Straight Line or Rotating), 814 Chestnut St., Rockford, Ill.
Cincinnati Grinders, Inc. (Centerless), Cincinnati, Ohio
Crane Packing Co., 1800 Cuyler Ave., Chicago, Ill. (Lapmaster Div.)
Fellows Gear Shaper Co., 78 River St., Springfield, Vt.
Gleason Works, 1000 University Ave., Rochester, N. Y.
Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich.
Micromatic Hone Corp., 8100 Schoolcraft, Detroit 4, Mich.
Norton Co., 1 New Bond St., Worcester 6, Mass.
Taft-Peirce Mfg. Co., Woonsocket, R. I.

(Continued on page 504)

Interested in better stampings?

Lower costs?

LINE UP with CLEVELANDS!



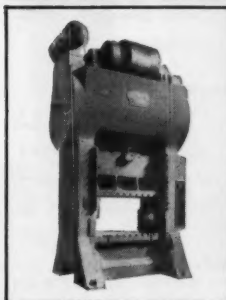
Cleveland Four Point Presses
450 tons capacity

You can easily select the exact type and size press for top efficiency on any stamping job from Cleveland's complete line.

The trouble-free Cleveland Drum Type Clutch gives you positive, instantaneous slide control. Its greater accuracy means fewer rejects. Lightweight and easy to maintain, it cuts press operating costs.

Make your new presses Clevelands. A Cleveland engineer will gladly help you choose the right model Clevelands for economical press production.

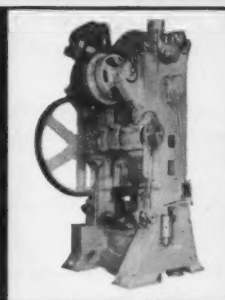
IF YOU WANT STAMPING ECONOMY, BUY CLEVELANDS POWERED BY THE CLUTCH THAT'S "REVOLUTIONIZING" PRESS PRODUCTION



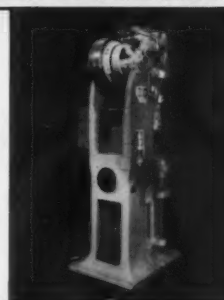
TWO POINT TWIN DRIVE



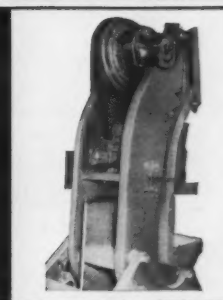
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KNUCKLE JOINT



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FABRICATING TOOLS

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Hirschmann Co., Carl, 30 Park Ave., Manhasset, N. Y.

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Armstrong Bros. Tool Co. 5200 W. Armstrong Ave., Chicago, Ill.
Williams, J. H., & Co., 400 Vulcan St., Buffalo 7, N. Y.

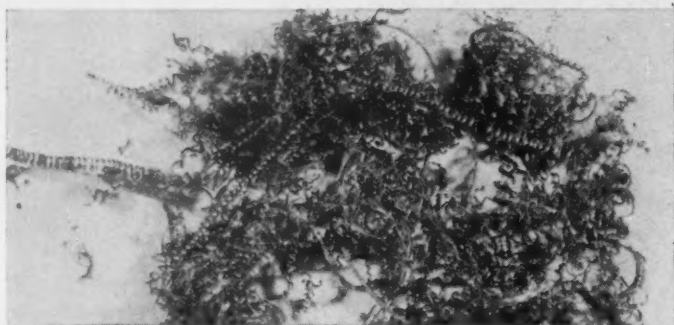
LATHE ATTACHMENTS

American Tool Works Co., Pearl and Eggleston Aves., Cincinnati, Ohio
Atlas Press Co., Kalamazoo, Mich.
Axelson Mfg. Co., P.O. Box 15335, Vernon Sta., Los Angeles 58, Cal.
Cincinnati Lathe & Tool Co., 3207-3211 Disney St., Oakley, Cincinnati 9, Ohio
Gisholt Machine Co., 1245 E. Washington Ave., Madison 10, Wis.
Jones & Lamson Mch., 160 Clinton St., Springfield, Vt.
LeBlond, R. K., Mch. Tool Co., Madison and Edwards Rds., Cincinnati 18, Ohio
Lehigh Foundries, Inc., 1500 Lehigh Dr., Easton, Pa.

Lodge & Shipley Co., 3055 Colerain Ave., Cincinnati 25, Ohio
Monarch Machine Tool Co., 27 Oak St., Sidney, Ohio
Pratt & Whitney, West Hartford 1, Conn.
Reed Rolled Thread Die Co., P.O. Box 350, Worcester 1, Mass.
Rivett Lathe & Grinder, Inc., Brighton, Boston 35, Mass.
Rockford Machine Tool Co., 2500 Kishwaukee St., Rockford, Ill.
Seneca Falls Mch. Co., Seneca Falls, N. Y.
Snyder Tool & Engrg. Co., 3400 E. Lafayette, Detroit 7, Mich.
Sidney Machine Tool Co., Sidney, Ohio
South Bend Lathe Works, Inc., 425 E. Madison St., South Bend, Ind.
Springfield Mch. Tool Co., Springfield, Ohio
Sundstrand Mch. Tool Co., 2431 11th St., Rockford, Ill.
Turchan Follower Machine Co., 8259 Livernois & Alaska Aves., Detroit, Mich.
Warner & Swasey Co., 5701 Carnegie Ave., Cleveland 3, Ohio

LATHES, Automatic

Axelson Mfg. Co., 6160 S. Boyle Ave., Los Angeles 58, Cal.



These chips (some as long as 6 inches) were cut away from the internal bore of a steel hydraulic cylinder.

FULMER **HONING MACHINES**

CUT AWAY AND FINISH BORES IN ONE CONTINUOUS OPERATION

Here's what they do:

1. *Cut away metal or other material, producing small chips ranging from dust to the familiar curly pattern of lathe chips, depending on the finish desired.*
2. *Finish to produce accurate bores of geometric precision to tolerances as close as .0001 (±).*

REMOVE up to 1½ cu. inches per minute.

for ferrous and non-ferrous metals, glass, plastic, etc.

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Cone Automatic Mch. Co., Inc., Windsor, Vt.
Cross Co., 3250 Bellevue Ave., Detroit 7, Mich.
Gisholt Machine Co., 1245 E. Washington Ave., Madison 10, Wis.
Goss & DeLeeuw Mch. Co., Kensington, Conn.
Hydra-Feed Machine Tool Corp., 730 W. Eight Mile Rd., Ferndale 20, Mich.
Jones & Lamson Mch. Co., 160 Clinton St., Springfield, Vt.
LeBlond, R. K., Mch. Tool Co., Madison and Edwards Rds., Cincinnati 18, Ohio
Lodge & Shipley Co., 3055 Colerain Ave., Cincinnati 25, Ohio
Monarch Machine Tool Co., 27 Oak St., Sidney, Ohio
National Acme Co., 170 E. 131st St., Cleveland, Ohio
New Britain Mch. Co., New Britain-Gridley Mch. Div., New Britain, Conn.
Potter & Johnston Co., 1027 Newport Ave., Pawtucket, R. I.
Pratt & Whitney, West Hartford 1, Conn.
Russell, Holbrook & Henderson, Inc., 292 Madison Ave., New York 17, N. Y.
Seneca Falls Mch. Co., Seneca Falls, N. Y.
Snyder Tool & Engrg. Co., 3400 E. Lafayette, Detroit 7, Mich.
Sundstrand Mch. Tool Co., 2531 11th St., Rockford, Ill.

LATHES, Axle

Consolidated Mch. Tool Corp., Rochester, N. Y.
LeBlond, R. K., Mch. Tool Co., Madison and Edwards Rds., Cincinnati 18, Ohio
Seneca Falls Mch. Co., Seneca Falls, N. Y.
Snyder Tool & Engrg. Co., 3400 E. Lafayette, Detroit 7, Mich.
Sundstrand Mch. Tool Co., 2531 11th St., Rockford, Ill.

LATHES, Bench

Atlas Press Co., Kalamazoo, Mich.
Cosa Corp., 405 Lexington Ave., New York 17, N. Y.
Hardinge Bros., Inc., 1418 College Ave., Elmira, N. Y.
LeBlond, R. K., Mch. Tool Co., Madison and Edwards Rds., Cincinnati 18, Ohio
Pratt & Whitney, West Hartford 1, Conn.
Rivett Lathe & Grinder, Inc., Brighton, Boston 35, Mass.
Seneca Falls Mch. Co., Seneca Falls, N. Y.
Sheldon Mch. Co., Inc., 4240-4258 N. Knox Ave., Chicago 41, Ill.
South Bend Lathe Works, Inc., 425 E. Madison St., South Bend, Ind.

LATHES, Boring

Axelson Mfg. Co., 6160 S. Boyle Ave., Los Angeles 58, Cal.
Baldwin-Lima-Hamilton Corp., Lima Hamilton Div., Hamilton, Ohio
Bullard Co., Brewster St., Bridgeport 2, Conn.
Gisholt Machine Co., 1245 E. Washington Ave., Madison 10, Wis.
LeBlond, R. K., Mch. Tool Co., Madison and Edwards Rds., Cincinnati 18, Ohio
Lodge & Shipley Co., 3055 Colerain Ave., Cincinnati 25, Ohio
Sidney Machine Tool Co., Sidney, Ohio

LATHES, Crankshaft

Consolidated Mch. Tool Corp., Rochester, N. Y.
LeBlond, R. K., Mch. Tool Co., Madison and Edwards Rds., Cincinnati 18, Ohio
Lempco Products, Inc., 5490 Dunham Rd., Bedford, Ohio
Snyder Tool & Engrg. Co., 3400 E. Lafayette, Detroit 7, Mich.
Sundstrand Mch. Tool Co., 2531 11th St., Rockford, Ill.

LATHES, Double-End

Cleveland Automatic Machine Co., 4932 Beech St., Cincinnati 12, Ohio.
Consolidated Mch. Tool Corp., Rochester, N. Y.
LeBlond, R. K., Mch. Tool Co., Madison and Edwards Rds., Cincinnati 18, Ohio
Snyder Tool & Engrg. Co., 3400 E. Lafayette, Detroit 7, Mich.
Sundstrand Mch. Tool Co., 2531 11th St., Rockford, Ill.

LATHES, Duplicating

Axelson Mfg. Co., 6160 S. Boyle Ave., Los Angeles 58, Cal.
Hydra-Feed Machine Tool Corp., 730 W. Eight Mile Rd., Ferndale 20, Mich.
Lodge & Shipley Co., 3055 Colerain Ave., Cincinnati 25, Ohio
Monarch Machine Tool Co., 27 Oak St., Sidney, Ohio
Sidney Machine Tool Co., Sidney, Ohio

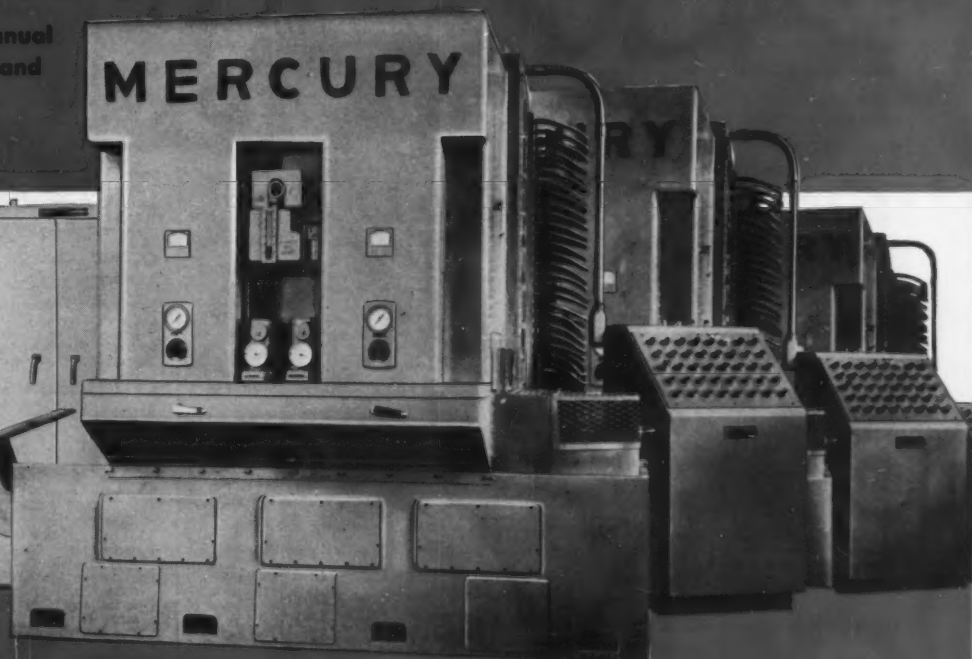
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A NEW PRODUCTION METHOD...

Transfer Grinding!

- ▶ Multi-Station Grinding for high productivity
- ▶ In-Line Transfer for production adaptability
- ▶ Rotary Chucking for guaranteed flatness, increased stock removal
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A SYMBOL OF FINE CRAFTSMANSHIP
SINCE 1933

One machine in this Mercury series produces automotive transmission parts at a rate of 250 pieces per hour. Each part is loaded, rough ground, finish ground and unloaded without manual handling.

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LUFKIN

BIG BARREL

Micrometers
have
an exclusive
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**CAM
LOCK**



Here's an exclusive new Lufkin plus to make your work easier. All of the features and optional choices of the complete new Lufkin 1900 Series BIG BARREL Micrometer line . . . plus a brand new, exclusive CAM LOCK. A flick of the thumb provides a secure and positive lock. Time-consuming "two handed" locking and the danger of errors through movement while locking are eliminated. You can have the new CAM LOCK on any Lufkin 1900 Series Big Barrel Micrometer . . . ask your Industrial Distributor to show it to you soon.

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- He cuts down your inventory investment in tools and parts.
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Barber-Colman Co. (Hendey Mch. Div.) Rockford, Ill.
Boye & Emmes Machine Tool Co., Cincinnati 15, Ohio.
Cincinnati Lathe & Tool Co., 3207-3211 Disney St., Oakley, Cincinnati 9, Ohio
Consolidated Mch. Tool Corp., Rochester, N. Y.
Cosa Corp., 405 Lexington Ave., New York 17, N. Y.
Greaves Machine Tool Co., 2009 Eastern Avenue, Cincinnati, Ohio
LeBlond, R. K., Mch. Tool Co., Madison and Edwards Rds., Cincinnati 18, Ohio
Lodge & Shipley Co., 3055 Colerain Ave., Cincinnati 25, Ohio
Monarch Machine Tool Co., 27 Oak St., Sidney, Ohio
Morey Machinery Co., Inc., 383 Lafayette St., New York 3, N. Y.
Nebel Machine Tool Co., 3401 Central Parkway, Cincinnati 25, Ohio
Orban, Kurt & Co., Inc., 205 E. 42nd St., New York 17, N. Y.
Pratt & Whitney, West Hartford 1, Conn.
Rivett Lathe & Grinder, Inc., Brighton, Boston 35, Mass.
Rockford Machine Tool Co., 2500 Kishwaukee St., Rockford, Ill.
Seneca Falls Mch. Co., Seneca Falls, N. Y.
Sheldon Mch. Co., Inc., 4240-4258 N. Knox Ave., Chicago 41, Ill.
Sidney Machine Tool Co., Sidney, Ohio
Simmons Machine Tool Corp., Albany, N. Y.
South Bend Lathe Works, Inc., 425 E. Madison St., South Bend, Ind.
Springfield Mch. Tool Co., Springfield, Ohio

LATHES, Gap

Axelson Mfg. Co., 6160 S. Boyle Ave., Los Angeles 58, Cal.
Boye & Emmes Machine Tool Co., Cincinnati 15, Ohio.
Cincinnati Lathe & Tool Co., 3207-3211 Disney St., Oakley, Cincinnati 9, Ohio
Gisholt Machine Co., 1245 E. Washington Ave., Madison 10, Wis.
LeBlond, R. K., Mch. Tool Co., Madison and Edwards Rds., Cincinnati 18, Ohio
Lodge & Shipley Co., 3055 Colerain Ave., Cincinnati 25, Ohio
Nebel Machine Tool Co., 3401 Central Parkway, Cincinnati 25, Ohio
Seneca Falls Mch. Co., Seneca Falls, N. Y.
Sidney Machine Tool Co., Sidney, Ohio
Springfield Mch. Tool Co., Springfield, Ohio
Warner & Swasey Co., 5701 Carnegie Ave., Cleveland 3, Ohio

LATHES, Gun

Axelson Mfg. Co., 6160 S. Boyle Ave., Los Angeles 58, Cal.
Consolidated Mch. Tool Corp., Rochester, N. Y.
LeBlond, R. K., Mch. Tool Co., Madison and Edwards Rds., Cincinnati 18, Ohio
Seneca Falls Mch. Co., Seneca Falls, N. Y.
Springfield Machine Tool Co., Springfield, Ohio

LATHES, Hollow Spindle

Axelson Mfg. Co., P.O. Box 15335, Vernon Sta., Los Angeles 58, Calif.
LeBlond, R. K., Mch. Tool Co., Madison and Edwards Rds., Cincinnati 18, Ohio
Lodge & Shipley Co., 3055 Colerain Ave., Cincinnati 25, Ohio
South Bend Lathe Works, Inc., 425 E. Madison St., South Bend, Ind.

LATHES, Manufacturing Type

Axelson Mfg. Co., 6160 S. Boyle Ave., Los Angeles 58, Cal.
Hydra-Feed Machine Tool Corp., 730 W. Eight Mile Rd., Ferndale 20, Mich.
Lipe-Rollway Corp., 806 Emerson Ave., Syracuse, N. Y.
Lodge & Shipley Co., 3055 Colerain Ave., Cincinnati 25, Ohio

LATHES, Spinning

Bliss, E. W., Co., 1375 Raff Rd., S. W. Canton, Ohio
Ferracute Machine Co., Bridgeton, N. J.

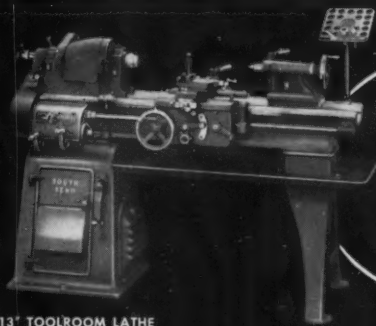
LATHES, Toolroom

See Lathes, Engine and Toolroom

LATHES, Turret

Bardons & Oliver Inc., Ft. W. 9th St., Cleveland 13, Ohio
Brown & Sharpe Mfg. Co., Providence, R. I.
Bullard Co., Brewster St., Bridgeport 2, Conn.
Cosa Corp., 405 Lexington Ave., New York 17, N. Y.
Gisholt Machine Co., 1245 E. Washington Ave., Madison 10, Wis.
Hardinge Brothers, Inc. (Bench or Cabinet Mounting), 1418 College Ave., Elmira, N. Y.
Jones & Lamson Mch. Co., 160 Clinton St., Springfield, Vt.

(Continued on page 510)



13" TOOLROOM LATHE

SOUTH BEND 13" LATHES



Illustrated—13" x 5' bed Toolroom Lathe, less motor and controls, f.o.b. factory.

\$1972

**for accurate,
low-cost machining**

South Bend 13" Lathes are popular where there is a variety of precision parts to be machined. Costs drop as their accuracy and efficiency keep production flowing fast even on the "headache" jobs. Operators prefer them for their simplicity and practically effortless handling. Also, set-ups and change-overs are made so quickly and easily that down-time is held to a minimum.

Now is the time to find out how these quality-built lathes can also bring you better machining at lower costs. Let your near-by South Bend distributor show you how they can ease your production, toolroom and maintenance machining problems. Or, mail coupon for literature on the 13" Toolroom and Quick Change Gear models.

SPECIFICATIONS

Swing—13 $\frac{1}{4}$ " over bed and saddle wings, 8" over saddle cross slide.

Distance Between Centers—28 $\frac{1}{4}$ ", 40 $\frac{1}{4}$ " and 52 $\frac{1}{4}$ ".

Collet Capacity—1" maximum (collets interchangeable with 10"-1", 14 $\frac{1}{2}$ ", 16" and 16-24" South Bend lathes).

Spindle Bore—1 $\frac{3}{8}$ ".

Spindle Speeds—Eight; 40, 60, 90, 135, 270, 418, 628 and 940 r.p.m. approx.

Longitudinal Feeds—48 R.H. or L.H., .0015" to .0841".

Cross Feeds—48, .0006" to .0315".

Thread Cutting—48 R.H. or L.H. pitches, 4 to 224 per inch.

Compared with our costs
OUR PRICES ARE LOWER
than they were back in 1941



Prices are closely tied to costs. Costs are still rising. Buy now before increased costs necessitate higher prices.

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☐ 10" to 16-24" FLOOR LATHES



☐ DRILL PRESSES



☐ $\frac{1}{2}$ " & 1" COLLET TURRET LATHES



☐ TOOL GRINDERS



☐ 7" BENCH SHAPERS

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Building Better Tools Since 1906 • SOUTH BEND LATHE • South Bend 22, Indiana

Here it is--the sensational new

HOLMES Combination HYDRAULIC

FORCING and STRAIGHTENING PRESS



Two Machines In One--Multiple Use...
Remarkable Versatility...Ready Adapt-
ability...Low Initial Cost.

In practically any metal fabricating operation, this much-talked-about new press will save time, labor, and material--and pay for itself in a hurry. And no wonder, just check these five major exclusive features:

- ★ **QUICK-CHANGE TABLES**--enable one press to do both forcing and straightening.
- ★ **INTERCHANGEABLE MANIFOLD**--on 5 to 35 ton presses. Cuts down time.
- ★ **O-RING GASKET-MOUNTED VALVES**--no pipes. Oil flows through manifold plate.
- ★ **SWING-OUT MOTOR AND PUMP PANEL**--easy accessibility, maintenance, service.
- ★ **ADJUSTABLE ILLUMINATION**--frosted incandescent tube lights whole work area.

If you're interested in increasing output...and...cutting costs--why not get ALL the details on the new Holmes Combination Hydraulic Forcing and Straightening Press? Write for Specifications Manual--TODAY. It's yours for the asking--with no obligation whatever.

Write--Dept. E-955

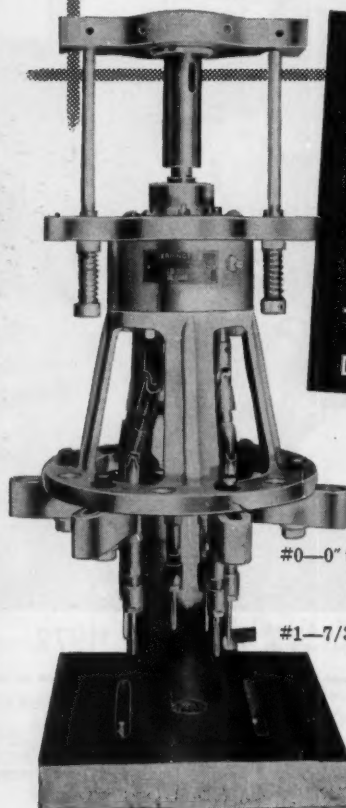
Stanley H. **HOLMES** Company

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ERRINGTON

UNIVERSAL JOINT ADJUSTABLE TAPPING & DRILLING HEAD

Here's another hi-speed production tool from Errington. This dependable tool is adjustable to any pattern of holes... is available with 4 or 6 spindles. Positive clutch drive and reverse. Head made of the best grade sand Cast Aluminum with hardened and ground gears and spindles (made in one piece). Full grooved ball thrust bearings at all thrust points and Oilite bronze radial bearings. Remember to do more... better... faster... rely on Errington Hi-Speed Production Tools.



LESS THAN
½ MINUTE
TO CHANGE
HEAD FROM
DRILLING TO
TAPPING OR
TAPPING TO
DRILLING

#0--0" to ¼" Tap Capacity
Min. centers 11/16"
Max. Pattern 5¼"

#1--7/32" to ½" Tap Capacity
Min. centers 1½"
Max. Pattern 8"

Send For Complete Information

ERRINGTON Mechanical Laboratory, Inc.

Established 1891

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SEE US AT BOOTH 249 PRODUCTION ENG. SHOW

you've never seen this one before!

LAPOINTE

now offers this

SINGLE RAM VERTICAL
BROACHING MACHINE
with **electro-motive drive!**

As a new addition to our impressive series of
electro-motive driven broaching machines, the
brand new **SRVE**

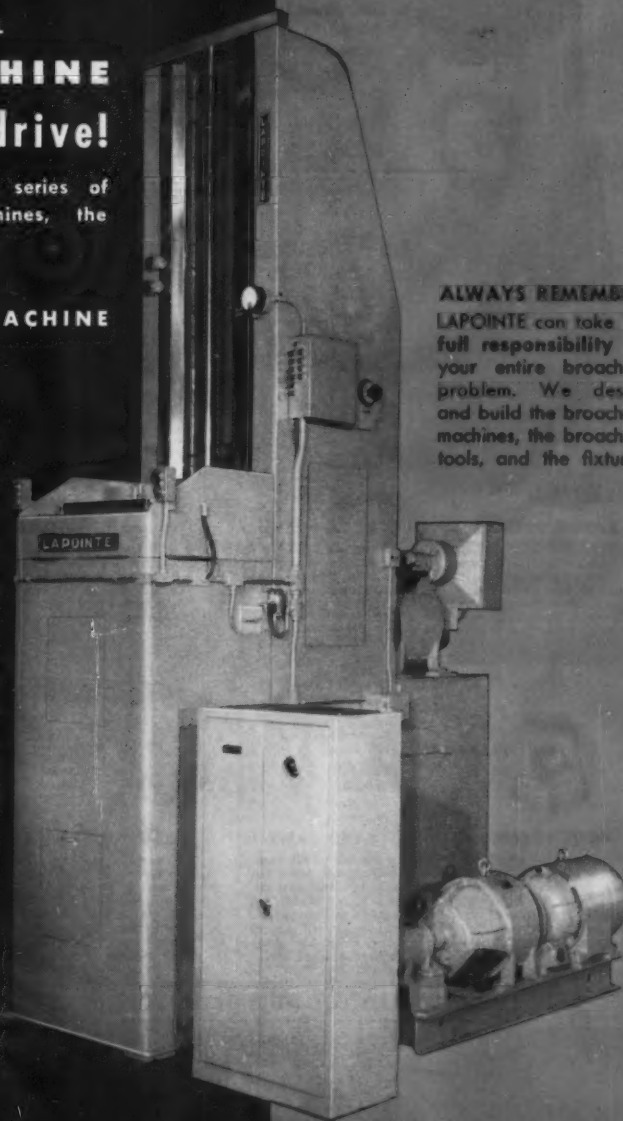
LAPOINTE BROACHING MACHINE

has a 100-inch stroke
50 h.p. motor
and a new slide.

Built with a massive, rugged frame and
driven by a powerful bull gear, this
new Lapointe Broaching Machine not
only offers outstanding production
capacity but it also produces a quality
of finish that will amaze you.

That's because its steady, powerful
stroke permits no chatter. And "no
chatter" also means that your broaches
will last 4 to 5 times longer,
between grinds.

You can get full information about
this new Lapointe machine by writing
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ALWAYS REMEMBER:
LAPOINTE can take the
full responsibility for
your entire broaching
problem. We design
and build the broaching
machines, the broaching
tools, and the fixtures.

THE **LAPOINTE**

MACHINE TOOL COMPANY

HUDSON, MASSACHUSETTS • U. S. A.

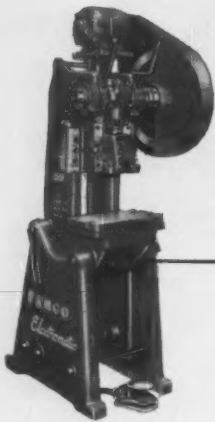
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THE WORLD'S OLDEST AND LARGEST MANUFACTURERS OF BROACHING MACHINES AND BROACHES

famco MACHINES

pay real cost-saving dividends



Famco machines—the choice of more and more leaders in the metal-working industry. This ever-increasing stamp of approval is in recognition of the superior quality and performance built into every Famco Machine. All parts are given that extra care in manufacture which means savings in time and money. They're simple to install, easy to operate, economical to use.

POWER PRESSES

Open back inclinable, standard and deep throat in bench and floor models. Ratings range from 4 to 18 tons capacity. Larger models feature the revolutionary and exclusive Famco "Electromatic" 9-point jaw clutch.



ARBOR PRESSES

Plain lever, simple ratchet, and combination compound and simple ratchet models — bench and floor models, deliver up to 15 tons pressure.



DRILL PRESSES

28 models of 15" presses in single and multiple spindle; tilting table and production models, bench and floor types.



AIR PRESSES

20 models, bench and floor types, 1/4 to 3 3/4 tons capacity. Built-in electric or air controls, single or dual control type.



FOOT PRESSES

Constructed of semi-steel close grained castings; precision-machined for long, unsurpassed, trouble-free operation. 10 bench and floor models that deliver up to 3 1/2 tons pressure.



BAND SAWS

4 models of horizontal cut-off saws for dry or wet cutting, with or without coolant system. Capacity: 6" round and 6" x 12" rectangular stock.



SQUARING SHEARS

18 models, modern all steel construction, shear up to 14 gauge mild steel; cutting widths 22 to 72 in. Power models feature single stroke mechanism and the exclusive Famco "Electromatic" 9-point jaw clutch.



SEE THE LATEST ADDITIONS TO OUR LINE!

FIRST SHOWING
BOOTH NO. 507
AT THE
MACHINE TOOL
SHOW



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Morey Machinery Co., Inc., 383 Lafayette St., New York 3, N. Y.
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Potter & Johnson Co. (Automatic), 1027 Newport Ave., Pawtucket, R. I.
Rivett Lathe & Grinder, Inc., Brighton, Boston 35, Mass.
Simmons Machine Tool Corp., Albany, N. Y.
South Bend Lathe Works, Inc., 425 E. Madison St., South Bend, Ind.
Springfield Mch. Tool Co., Springfield, Ohio
Warner & Swasey Co., 5701 Carnegie Ave., Cleveland 3, Ohio

LATHES, Vertical Turret

American Steel Foundries, King Mch. Tool Div., Paddock Rd. and Tennessee Ave., Cincinnati, Ohio
Baird Machine Co., 1700 Stratford Ave., Stratford, Conn.
Baldwin-Lima-Hamilton Corp., Lima Hamilton Div., Hamilton, Ohio
Bullard Co., Brewster St., Bridgeport 2, Conn.
Orban, Kurt & Co., Inc., 205 E. 42nd St., New York 17, N. Y.

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LEVELS

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Millers Falls Co., Greenfield, Mass.
Pratt & Whitney, West Hartford 1, Conn.
Starrett, The L. S. Co., Athol, Mass.
Taft-Peirce Mfg. Co., Woonsocket, R. I.

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Houghton, E. F. & Co., 303 W. Lehigh Ave., Philadelphia, Pa.
Lubriplate Div., Fiske Bros. Refining Co., 120 Lockwood St., Newark 5, N. J.
Shell Oil Co., 50 W. 50th St., New York, N. Y.
Sinclair Refining Co., 600 5th Ave., New York, N. Y.
Socony Vacuum Oil Co., Inc., 26 Broadway, New York, N. Y.
Standard Oil Co. (Indiana), 910 S. Michigan, Chicago, Ill.
Stuart, D. A., Oil Co., Ltd., 2739 S. Troy St., Chicago 23, Ill.
Sun Oil Co., 1608 Walnut St., Philadelphia, Pa.
Texas Co., 135 E. 42nd St., New York, N. Y.
White & Bagley Co., Worcester, Mass.

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Madison-Kipp Corp., Madison, Wis.
Norgren, C. A. Co., Inc., 3419 S. Elati St., Englewood, Colo.
Onsrud Machine Works, Inc., 3940 Palmer St., Chicago, Ill.
Rivett Lathe & Grinder, Inc., Brighton, Boston 35, Mass.

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MAGNETIC BASES FOR INDICATORS

du Mont Corp., Greenfield, Mass.

MANDRELS

See Arbors and Mandrels.

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DoAll Co., 254 N. Laurel Ave., Des Plaines, Ill.
Federal Products Corp., P.O. Box 1027, Providence, R. I.
Lufkin Rule Co., Hess Ave., Saginaw, Mich.
Max Wyler, 611 W. 43rd St., New York 36, N. Y.
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(Continued on page 512)

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Cincinnati Milling Machine Co., Cincinnati, Ohio
Consolidated Machine Tool Corp., Rochester, N. Y.
Gorton, George, Mch. Co., 1110 W. 13th St., Racine, Wis.
Ingersoll Milling Mch. Co., 2442 Douglas St., Rockford, Ill.
Kearney & Trecker Corp., Milwaukee, Wis.
Kempson Machine Co., Milwaukee, Wis.
Pratt & Whitney, West Hartford 1, Conn.
Rivett Lathe & Grinder, Inc., Brighton, Boston 35, Mass.
Sundstrand Mch. Tool Co., 2531 11th St., Rockford, Ill.
Turchan Follower Machine Co., 8259 Livernois & Alaska Aves., Detroit, Mich.
Van Keuren Co., 176 Waltham St., Watertown, Boston, Mass.
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Jones & Lamson Mch. Co. (Automatic), 160 Clinton St., Springfield, Vt.
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Millholland, W. K., Machinery Co., 6402 Westfield Blvd., Indianapolis 5, Ind.
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Sundstrand Mch. Tool Co., 2531 11th St., Rockford, Ill.
U. S. Tool Co., Inc., 255 North 18th St., Amper, N. J.

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Hardinge Bros., Inc. (Bench or Pedestal Type), 1418 College Ave., Elmira, N. Y.
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U. S. Burke Machine Tool Div., Brotherton Rd., Cincinnati 27, Ohio.

(Continued on page 514)

AIRengineering at work
REPORT No. 4240.70

Air Motor

Takes "Backache" Out of Molding Job...

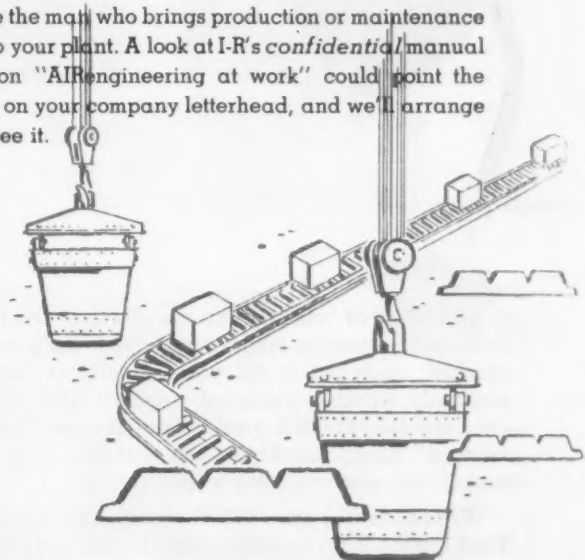
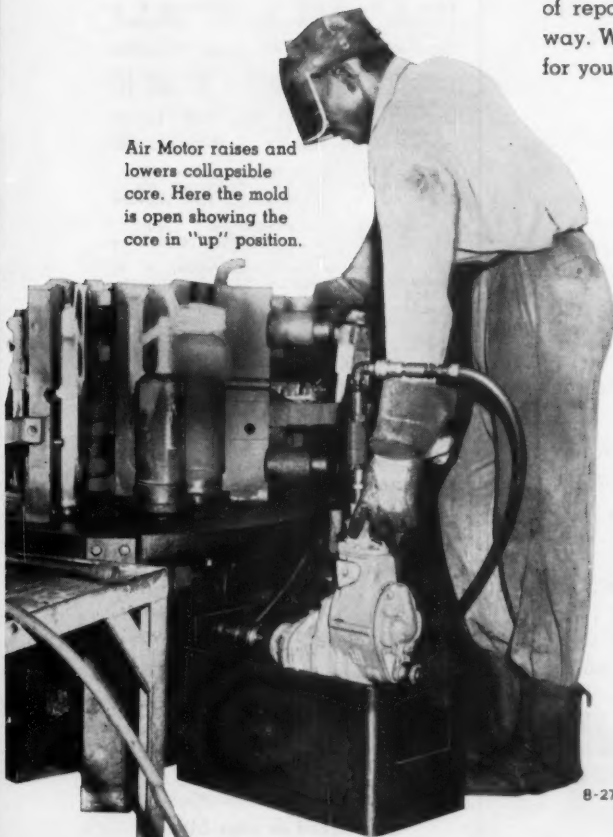
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Air Motor raises and lowers collapsible core. Here the mold is open showing the core in "up" position.



Ingersoll-Rand

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AIRengineering Manual

Don't miss over 100
interesting case history
applications of
AIRengineering in this
confidential manual



8-271

Before you hang up,



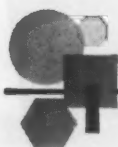
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Gould & Eberhardt Inc., Newark, N. J.
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Kearney & Trecker Corp., Milwaukee, Wis.
Snyder Tool & Engrg. Co., 3400 E. Lafayette, Detroit 7, Mich.
Sundstrand Mch. Tool Co., 2531 11th St., Rockford, Ill.

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Consolidated Mch. Tool Corp., Rochester, N. Y.
Espin-Lucas Mch. Works, Front St., and Girard Ave., Philadelphia, Pa.
Ingersoll Milling Mch. Co., 2442 Douglas St., Rockford, Ill.
Kearney & Trecker Corp., Milwaukee, Wis.
Nichols-Morris Corp., 76 Mamaroneck Ave., White Plains, N. Y.
Snyder Tool & Engrg. Co., 3400 E. Lafayette, Detroit 7, Mich.
Sundstrand Mch. Tool Co., 2531 11th St., Rockford, Ill.
U. S. Tool Co., Inc., 255 North 18th St., Ampere, N. J.

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Frew Machine Co., 121 East Luray St., Philadelphia 20, Pa.
Nichols-Morris Corp., 76 Mamaroneck Ave., White Plains, N. Y.
U. S. Burke Machine Tool Div., Brotherton Rd., Cincinnati 27, Ohio.
U. S. Tool Co., Inc., 255 North 18th St., Ampere, N. J.
Van Norman Co., 3640 Main St., Springfield 7, Mass.

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Baldwin-Lima-Hamilton Corp., Lima Hamilton Div., Hamilton, Ohio.
Brown & Sharpe Mfg. Co., Providence, R. I.
Cincinnati Milling Machine Co., Cincinnati, Ohio.
Consolidated Machine Tool Corp., Rochester, N. Y.
Cosa Corp., 405 Lexington Ave., New York 17.
Gorton, Geo., Mch. Co., 1110 W. 13th St., Racine, Wis.
Greaves Machine Tool Co., 2009 Eastern Avenue, Cincinnati, Ohio.
Ingersoll Milling Mch. Co., 2442 Douglas St., Rockford, Ill.
Kearney & Trecker Corp., Milwaukee, Wis.
Kemsmith Machine Co., Milwaukee, Wis.
Orban, Kurt & Co., Inc., 205 E. 42nd St., New York 17, N. Y.
Pratt & Whitney, West Hartford 1, Conn.
Sheldon Machine Co., Inc., 4240-4258 N. Knox Ave., Chicago 41, Ill.
Simmons Machine Tool Corp., Albany, N. Y.
Snyder Tool & Engrg. Co., 3400 E. Lafayette, Detroit 7, Mich.
Sundstrand Mch. Tool Co., 2531 11th St., Rockford, Ill.
Van Norman Co., 3640 Main St., Springfield 7, Mass.

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Sundstrand Mch. Tool Co., 2531 11th St., Rockford, Ill.

MILLING MACHINES, Planer Type

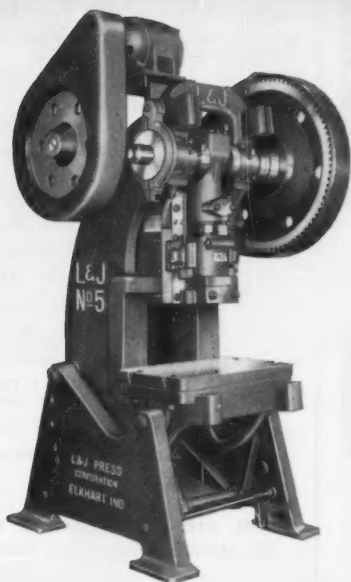
Baldwin-Lima-Hamilton Corp., Lima Hamilton Div., Hamilton, Ohio.
Consolidated Mch. Tool Corp., Rochester, N. Y.
Espin-Lucas Mch. Works, Front St., and Girard Ave., Philadelphia, Pa.
Giddings & Lewis Machine Tool Co., Fond du Lac, Wis.
Gray, G. A., Co., Woodburn Ave., and Penn. R. R., Evanston, Cincinnati, Ohio.
Ingersoll Milling Mch. Co., 2442 Douglas St., Rockford, Ill.
Kearney & Trecker Corp., Milwaukee, Wis.
Pratt & Whitney, West Hartford 1, Conn.

MILLING MACHINES, Profile

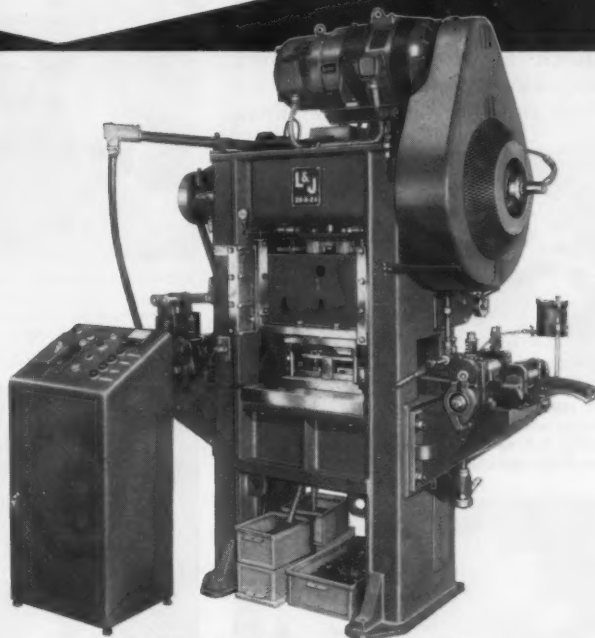
Cincinnati Milling Machine Co., Cincinnati, Ohio.
Cosa Corp., 405 Lexington Ave., New York 17.
Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit 32, Mich.
Frew Machine Co., 121 East Luray St., Philadelphia 20, Pa.
Gorton, Geo., Mch. Co., 1110 W. 13th St., Racine, Wis.

(Continued on page 516)

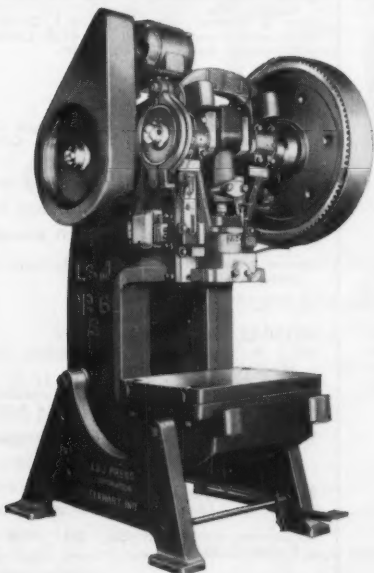
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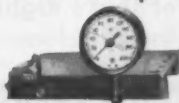
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L&J Press Corporation, 1631 Sterling Ave., Elkhart, Indiana



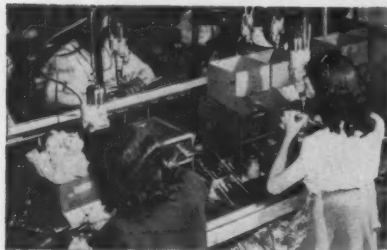
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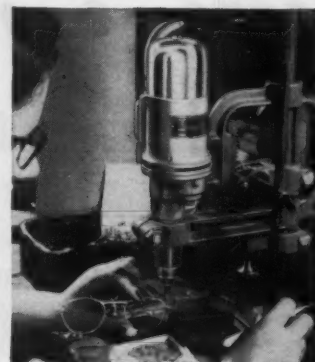
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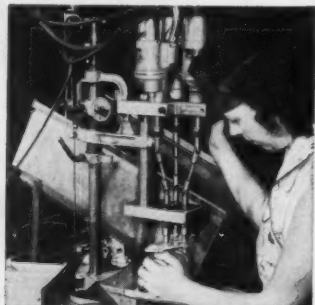
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 Orban, Kurt & Co., Inc., 205 E. 42nd St., New York 17, N. Y.
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 Cose Corp., 405 Lexington Ave., New York 17, N. Y.
 Gorton, Geo., Mch. Co., 1110 W. 13th St., Racine, Wis.
 Pratt & Whitney, West Hartford 1, Conn.
 Turchan Follower Machine Co., 8259 Livernois & Alaska Aves., Detroit, Mich.

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American Steel Foundries, Elmes Engrg. Div., Paddock Rd. and Tennessee Ave., Cincinnati, Ohio.
 Erie Foundry Co., Erie, Pa.
 Hannifin Corp., 501 S. Wolf Rd., Des Plaines, Ill.
 Hydraulic Press Mfg. Co., 300 Lincoln Ave., Mt. Gilead, Ohio.
 Rockford Machine Tool Co., 2500 Kiskadee St., Rockford, Ill.
 Verson Allsteel Press Co., 93rd St., & S. Kenwood Ave., Chicago, Ill.

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Delco Products Div., General Motors Corp., 321 E. First St., Dayton, Ohio.
 General Electric Co., Schenectady, N. Y.
 Howell Electric Motors Co., Howell, Mich.
 Reliance Electric & Engrg. Co., 1074 Ivanhoe Rd., Cleveland 10, Ohio.
 Westinghouse Electric Corp., E. Pittsburgh, Pa.

MOTORS, Hydraulic

Oilgear Co., 1569 W. Pierce St., Milwaukee, Wis.
 Sundstrand Mch. Tool Co., 2531 11th St., Rockford, Ill.

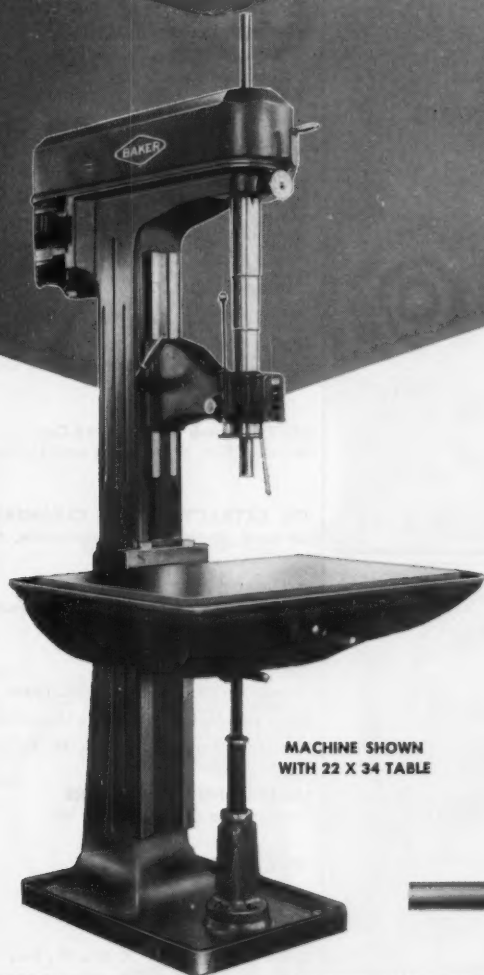
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(Continued on page 518)

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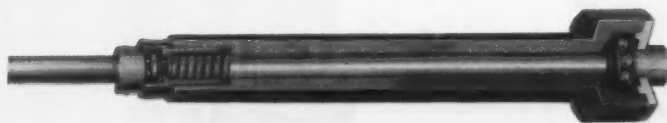
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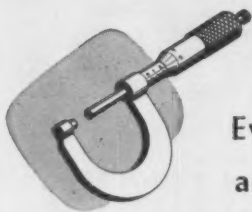
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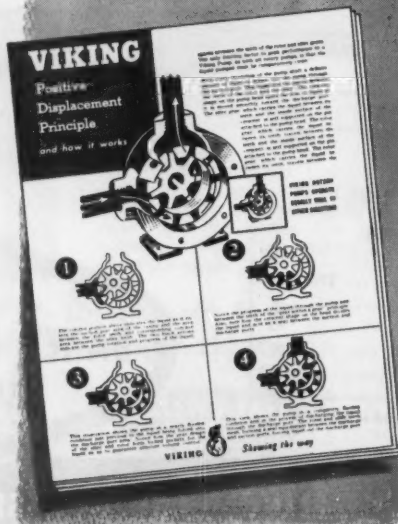
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NUT SETTING EQUIPMENT

See Screw Driving and Nut Setting Equipment.

NUT TAPPERS

See Bolt and Nut Machinery.

NUTS, Cold Forged, Wing and Cap

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Parker-Kalon Div., General American Transportation Corp., 200 Varick St., New York, N. Y.
Union Drawn Steel Co., Div., Republic Steel Corp., Massillon, Ohio.

NUTS, Self-locking

Grip Nut Co., 310 S. Michigan Ave., Chicago 4, Ill.

NUTS, Thumb or Wing and Cap

Williams, J. H., & Co., 400 Vulcan St., Buffalo 7, N. Y.

OIL EXTRACTORS AND CLEANERS

De Laval Separator Co., Poughkeepsie, N. Y.

OIL GROOVERS

Wicaco Mch. Corp., Wayne Junction, Philadelphia, Pa.

OIL SEALS

Chicago Rawhide Mfg. Co., 1301 Elston Ave., Chicago 22, Ill.
Crane Packing Co., 1800 Cuyler Ave., Chicago, Ill.
Garlock Packing Co., Palmyra, N. Y.

OILERS AND LUBRICATORS

Madison-Kipp Corp., Madison, Wis.

OILS, Cutting

See Cutting and Grinding Fluids.

OILS, Lubricating

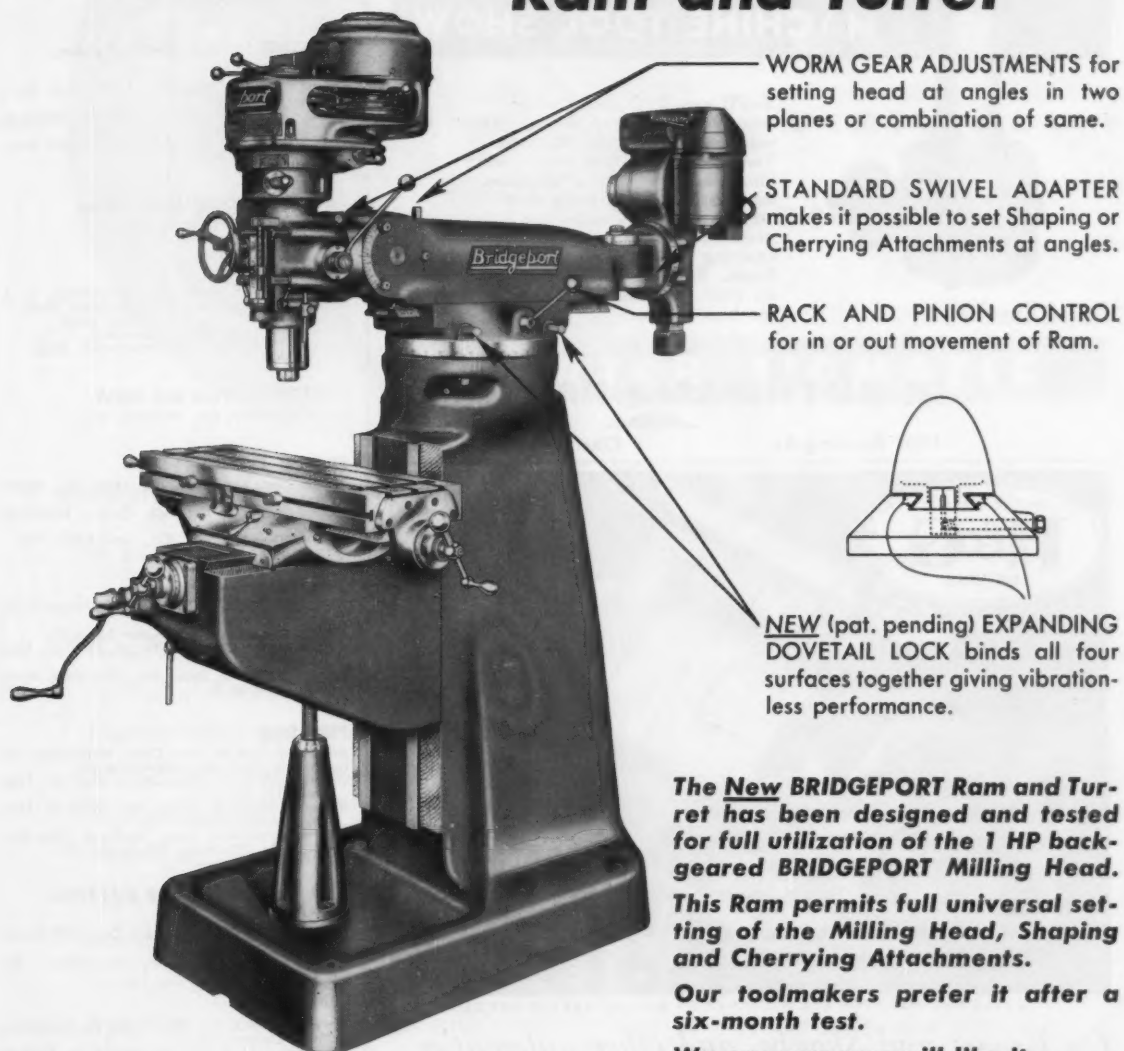
Cities Service Oil Co., 70 Pine St., New York, N. Y.
Houghton & Co., E. F., 303 W. Lehigh Ave., Philadelphia, Pa.
Shell Oil Co., 50 W. 50th St., New York, N. Y.
Sinclair Refining Co., 600 5th Ave., New York.
Socony Vacuum Oil Co., Inc., 26 Broadway, New York, N. Y.
Standard Oil Co., (Indiana), 910 S. Michigan, Chicago, Ill.
Stuart Oil Co., Ltd., D. A., 2739 S. Troy St., Chicago 23, Ill.
Sun Oil Co., 1608 Walnut St., Philadelphia, Pa.
Texas Co., 135 E. 42nd St., New York, N. Y.

OILS, Quenching and Tempering

Cities Service Oil Co., 70 Pine St., New York, N. Y.
Houghton & Co., E. F., 303 W. Lehigh Ave., Philadelphia, Pa.
Shell Oil Co., 50 W. 50th St., New York, N. Y.
Sinclair Refining Co., 600 5th Ave., New York.
Standard Oil Co., (Indiana), 910 S. Michigan, Chicago, Ill.
Stuart Oil Co., Ltd., D. A., 2739 S. Troy St., Chicago 23, Ill.

(Continued on page 520)

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O-P

OILS, Soluble

See Compounds, Cutting, Grinding, Metal Drawing, Etc.

OPTICAL FLATS

Crane Packing Co., 1800 Cuyler Ave., Chicago.
Scherr, George, Co., Inc., 200 Lafayette St., New York 12, N. Y.

ORDNANCE MACHINES, Special

Baldwin-Lima-Hamilton Corp., Lima Hamilton Div., Hamilton, Ohio.
Baird Machine Co., 1700 Stratford Ave., Stratford, Conn.
Millholland, W. K. Machinery Co., 6402 Westfield Blvd., Indianapolis 5, Ind.
Rehnberg-Jacobson Mfg. Co., 2135 Kishwaukee St., Rockford, Ill.
Version Allsteel Press Co., 93rd St., & S. Kenwood Ave., Chicago, Ill.

PACKING, Leather, Metal, Rubber, Asbestos, Etc.

Chicago Rawhide Mfg. Co., 1301 Elston Ave., Chicago 22, Ill.
Crane Packing Co., 1800 Cuyler Ave., Chicago.
Garlock Packing Co., Palmyra, N. Y.
Houghton & Co., E. F., 303 W. Lehigh Ave., Philadelphia, Pa.

PAINTING EQUIPMENT, Spray

Lowe Bros. Co., Dayton, Ohio.

PARALLELS

Brown & Sharpe Mfg. Co., Providence, R. I.
Lufkin Rule Co., Hess Ave., Saginaw, Mich.
Starrett, The L. S. Co., Athol, Mass.
Taft-Peirce Mfg. Co., Woonsocket, R. I.
Walker, O. S., Co., Inc., Worcester, Mass.

PATTERNS, Wood and Metal

Mummert-Dixon Co., Hanover, Pa.

PILLOW BLOCKS

Boston Gear Works, 3200 Main St., North Quincy 71, Mass.
Norma-Hoffman Bearings Corp., Stamford, Conn.
Standard Pressed Steel Co., Jenkintown, Pa.

PIPE, Brass and Copper

American Brass Co., 25 Broadway, New York, N. Y.
Mueller Brass Co., Port Huron 35, Mich.
Orban, Kurt & Co., Inc., 205 E. 42nd St., New York 17, N. Y.
Revere Copper & Brass Inc., 230 Park Ave., New York, N. Y.

PIPE, Steel

Allegheny Ludlum Steel Corp., Pittsburgh, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Orban, Kurt & Co., Inc., 205 E. 42nd St., New York 17, N. Y.
Ryerson, Joseph T., & Son, Inc., 2558 W. 16th St., Chicago 18, Ill.
United States Steel Corp., National Tube Co., Div., 436 7th Ave., Pittsburgh, Pa.

PIPE THREADING AND CUTTING MACHINES

Cleveland Automatic Machine Co., 4932 Beech St., Cincinnati 12, Ohio.
Landis Machine Co., Inc., Waynesboro, Pa.

PIPE TONGS

Armstrong Bros. Tool Co., 5200 W. Armstrong Ave., Chicago, Ill.
Williams, J. H. & Co., 400 Vulcan St., Buffalo 7, N. Y.

PLANNER ATTACHMENTS

Consolidated Mch. Tool Corp., Rochester, N. Y.
Giddings & Lewis Machine Tool Co., Fond du Lac, Wis.
Gray, G. A., Co., Woodburn Ave., and Penn R. R. Evanston, Cincinnati, Ohio.
Rockford Machine Tool Co., 2500 Kishwaukee St., Rockford, Ill.
Turchan Follower Machine Co., 8259 Livernois & Alaska Aves., Detroit, Mich.
Young Mch. Tool Div., Church Rd., Bridgeport, Pa.

(Continued on page 522)

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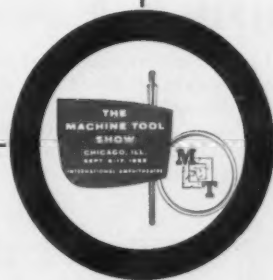
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Young Mch. Tool Div., Church Rd., Bridgeport, Pa.

PLANERS, Double Housing and Openside

Baldwin-Lima-Hamilton Corp., Eddystone Div., Philadelphia 42, Pa.
Baldwin-Lima-Hamilton Corp., Lima Hamilton Div., Hamilton, Ohio.
Cleveland Punch & Shear Works Co., 3917 St. Clair Ave., N. E., Cleveland, Ohio (Plate).
Consolidated Mch. Tool Corp. (Incl. Plate, Rotary and Crank Types), Rochester, N. Y.
Giddings & Lewis Machine Tool Co., Fond du Lac, Wis.
Gray, G. A. Co., Woodburn Ave., and Penn R. R. Evanston, Cincinnati, Ohio.
Morton Mfg. Co., Muskegon Heights, Mich.
Rockford Machine Tool Co., 2500 Kishwaukee St., Rockford, Ill.
Young Mch. Tool Div., Church Rd., Bridgeport, Pa.

PLATE ROLLS

Baldwin-Lima-Hamilton Corp., Eddystone Div., Philadelphia 42, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Cleveland Punch & Shear Works Co., 3917 St. Clair Ave., N. E., Cleveland, Ohio.
Consolidated Mch. Tool Corp., Rochester, N. Y.
Ryerson, Joseph T., & Son, Inc., 2558 W. 16th St., Chicago 18, Ill.

PLATES, Angle

Swanson Tool & Machine Products, Inc., 854 E. 8th St., Erie, Pa.

PLATES, Surface

Brown & Sharpe Mfg. Co., Providence, R. I.
Brush Electronics Co., 3405 Perkins Ave., Cleveland, Ohio.
Challenge Machinery Co., Grand Haven, Mich.
DoAll Co., 254 N. Laurel Ave., Des Plaines, Ill.
Pratt & Whitney Div., West Hartford 1, Conn.
Scherr, George, Co., Inc., 200 Lafayette St., New York 12, N. Y.
Swanson Tool & Machine Products, Inc., 854 E. 8th St., Erie, Pa.
Taff-Peirce Mfg. Co., Woonsocket, R. I.
U. S. Tool Co., Inc., 255 North 18th St., Amper, N. J.

PNEUMATIC EQUIPMENT

Bliss Co., E. W., 1375 Raff Rd., S. W., Canton, Ohio.
Chicago Pneumatic Tool Co., 6 E. 44th St., New York, N. Y.
Hannifin Corp., 501 S. Wolf Rd., Des Plaines, Ill.
Ingersoll-Rand Co., Phillipsburg, N. J.
Lehigh Foundries, Inc., 1500 Lehigh Dr., Easton, Pa.
Logansport Machine Co., Inc., 810 Center Ave., Logansport, Ind.
Onsrud Machine Works Inc., 3940 Palmer St., Chicago, Ill.

POLISHING LATHES AND MACHINES

Gardner Machine Co., 414 E. Gardner St., Beloit, Wis.
Hill Acme Co., 1201 W. 65th St., Cleveland 2, Ohio.
Millers Falls Co., Greenfield, Mass.
Standard Electrical Tool Co., 2488-90 River Rd., Cincinnati, Ohio.
Sundstrand Machine Tool Co., 2531 11th St., Rockford, Ill.

POLISHING TOOLS, Portable

Sundstrand Machine Tool Co., 2531 11th St., Rockford, Ill.

POWER UNITS, Hydraulic

See Hydraulic Power Units or Tool Heads

PRESSES, Arbor

Baldwin-Lima-Hamilton Corp., Eddystone Div., Philadelphia 42, Pa.
Dake Corp., 604 Seventh St., Grand Haven, Mich.
duMont Corp., Greenfield, Mass.
Famco Machine Co., 3134 Sheridan Rd., Kenosha, Wis.
Hannifin Corp., 501 S. Wolf Rd., Des Plaines, Ill.
Lempco Products, Inc., 5490 Durham Rd., Bedford, Ohio.
Logansport Machine Co., Inc., 810 Center Ave., Logansport, Ind.
Threadwell Tap & Die Co., Greenfield, Mass.
Tomkins-Johnson Co., 614 No. Mechanic St., Jackson, Mich.
Wilson, K. R., Inc., 211 Mill St., Arcade, N. Y.

PRESSES, Broaching

American Broach & Mch. Co., Ann Arbor, Mich.
Bliss Co., E. W., 1375 Raff Rd., S. W., Canton, Ohio.
Colonial Broach Co., P.O. Box 37, Harper Sta., Detroit 13, Mich.
Dake Corp., 604 Seventh St., Grand Haven, Mich.
Ferracute Machine Co., Bridgeton, N. J.
Lake Erie Engrg. Co., Kenmore Station, Buffalo, N. Y.
Lapointe Machine Tool Co., 34 Tower St., Hudson, Mass.

PRESSES, Extrusion

American Steel Foundries, Elmes Engrg. Div., Paddock Rd. and Tennessee Ave., Cincinnati.
Bliss Co., E. W., 1375 Raff Rd., S. W., Canton, Ohio.
Chambersburg Engrg. Co., Chambersburg, Pa.
Erie Foundry Co., Erie, Pa.
Hydraulic Press Mfg. Co., 300 Lincoln Ave., Mt. Gilead, Ohio.
Hydropress, Inc., 350 Fifth Ave., New York 1, N. Y.
Lake Erie Engrg. Co., Kenmore Station, Buffalo, N. Y.
Verson Allsteel Press Co., 93rd St., & S. Kenwood Ave., Chicago, Ill.

PRESSES, Foot

Bliss Co., E. W., 1375 Raff Rd., S. W., Canton, Ohio.
Famco Machine Co., 3134 Sheridan Rd., Kenosha, Wis.
Ferracute Machine Co., Bridgeton, N. J.
Niagara Machine & Tool Works, 683 Northland Ave., Buffalo, N. Y.

PRESSES, Forging

Ajax Mfg. Co., Euclid, Cleveland 17, Ohio.
American Steel Foundries, Elmes Engrg. Div., Paddock Rd. and Tennessee Ave., Cincinnati, Ohio.
Baldwin-Lima-Hamilton Corp., Eddystone Div., Philadelphia 42, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Bliss Co., E. W., 1375 Raff Rd., S. W., Canton, Ohio.
Clearing Mch. Corp., Div. U. S. Industries, Inc., 6499 W. 65th St., Chicago, Ill.
Cleveland Punch & Shear Works Co., 3917 St. Clair Ave., N. E., Cleveland, Ohio.
Dake Corp., 604 Seventh St., Grand Haven, Mich.
Erie Foundry Co., Erie, Pa.
Ferracute Machine Co., Bridgeton, N. J.
Hydraulic Press Mfg. Co., 300 Lincoln Ave., Mt. Gilead, Ohio.
Hydropress, Inc., 350 Fifth Ave., New York 1, N. Y.
Lake Erie Engrg. Corp., Kenmore Station, Buffalo, N. Y.
National Mchry. Co., Greenfield and Stanton Sts., Tiffin, Ohio.
Niagara Machine & Tool Works, 683 Northland Ave., Buffalo, N. Y.
Verson Allsteel Press Co., 93rd St., and S. Kenwood Ave., Chicago, Ill.
Wilson, K. R., Inc., 211 Mill St., Arcade, N. Y.

PRESSES, Hydraulic

American Broach & Mch. Co., Ann Arbor, Mich.
American Steel Foundries, Elmes Engrg. Div., Paddock Rd. and Tennessee Ave., Cincinnati, Ohio.
Anderson Bros. Mfg. Co., 1910 Kishwaukee St., Rockford, Ill.
Baldwin-Lima-Hamilton Corp., Eddystone Div., Philadelphia 42, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Birdsboro Steel Fdry. & Mch. Co., Birdsboro, Pa.
Bliss Co., E. W., 1375 Raff Rd., S. W., Canton, Ohio.
Chambersburg Engrg. Co., Chambersburg, Pa.
Cincinnati Milling Mch. Co. (Hydroform), Cincinnati 9, Ohio.
Cincinnati Milling Mch. Co. (Hydroform), Cincinnati 9, Ohio.
Clearing Mch. Corp., Div. U. S. Industries, Inc., 6499 W. 65th St., Chicago, Ill.
Colonial Broach Co., P.O. Box 37, Harper Sta., Detroit, Mich.
Dake Corp., 604 Seventh St., Grand Haven, Mich.
Denison Engrg. Co., 1160 Dublin St., Columbus 16, Ohio.
Detroit Broach Co., (special & semi-special) P. O. Box 156, Rochester, Mich.
Erie Foundry Co., Erie, Pa.
Farrel-Birmingham Co., Inc., 25 Main St., Ansonia, Conn.
Federal Mch. & Welder Co., Warren, Ohio.
Hannifin Corp., 501 S. Wolf Rd., Des Plaines, Ill.
Hydraulic Press Mfg. Co., 300 Lincoln Ave., Mt. Gilead, Ohio.
Hydropress Inc., 350 Fifth Ave., New York 1, N. Y.

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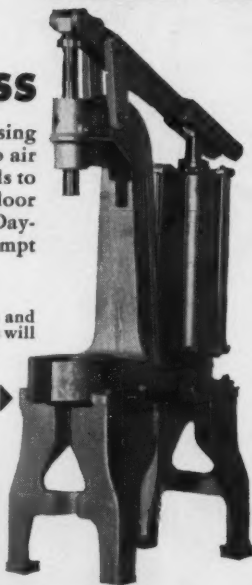


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 Lempro Products, Inc., 5490 Durham Rd., Bedford, Ohio.
 Niagara Machine & Tool Works, 683 Northland Ave., Buffalo, N. Y.
 Verson Allsteel Press Co., 93rd St. and S. Kenwood Ave., Chicago, Ill.
 Wilson, K. R., Inc., 211 Mill St., Arcade, N. Y.
 Young Mch. Tool Div., Church Rd., Bridgeport, Pa.

PRESSES, Screw

Bliss Co., E. W., 1375 Raff Rd., S. W., Canton, Ohio.
 Duke Corp., 604 Seventh St., Grand Haven, Mich.
 Ferracute Machine Co., Bridgeton, N. J.
 Niagara Machine & Tool Works, 683 Northland Ave., Buffalo, N. Y.

PRESSES, Sheet Metal Working

Allen, Alva F., Box 426, Clinton, Mo. (Bench)
 American Steel Foundries, Elmes Engrg. Div., Paddock Rd. and Tennessee Ave., Cincinnati, Ohio.
 Baldwin-Lima-Hamilton Corp., Eddystone Div., Philadelphia 42, Pa.
 Bliss Co., E. W., 1375 Raff Rd., S. W., Canton, Ohio.
 Chambersburg Engrg. Co., Chambersburg, Pa.
 Cincinnati Milling Mch. Co. (Hydroform), Cincinnati 9, Ohio.
 Cincinnati Shaper Co., Elam and Garrard Aves., Cincinnati, Ohio.
 Clearing Mch. Corp., Div. U. S. Industries, Inc., 6499 W. 65th St., Chicago, Ill.
 Cleveland Crane & Engrg. Co., Wickliffe, Ohio.
 Cleveland Punch & Shear Works Co., 3917 St. Clair Ave., N. E., Cleveland, Ohio.
 Consolidated Mch. Tool Corp., Rochester, N. Y.
 Duke Corp., 604 Seventh St., Grand Haven, Mich.
 Danly Machine Specialties, Inc., 2107 S. 52nd Ave., Chicago 50, Ill.
 Dreis & Krump Mfg. Co., 7416 Loomis Blvd., Chicago 50, Ill.
 Erie Foundry Co., Erie, Pa.
 Espen-Lucas Machine Works, Front St., and Girard Aves., Philadelphia, Pa.
 Famco Machine Co., 3134 Sheridan Rd., Kenosha, Wis.
 Federal Machine & Welder Co., Overland Ave., Warren, Ohio.
 Ferracute Machine Co., Bridgeton, N. J.
 Hydraulic Press Mfg. Co., 300 Lincoln Ave., Mt. Gilead, Ohio.
 Hydropress, Inc., 350 Fifth Ave., New York 1, N. Y.
 Lake Erie Engrg. Corp., Kenmore Station, Buffalo, N. Y.
 L & J Press Corp., Elkhart, Ind.
 Minster Machine Co., Minster, Ohio.
 Niagara Machine & Tool Works, 683 Northland Ave., Buffalo, N. Y.
 Verson Allsteel Press Co., 93rd St. and S. Kenwood Ave., Chicago, Ill.
 Wales-Strippert Corp., North Tonawanda, N. Y.
 Wilson, K. R., Inc., 211 Mill St., Arcade, N. Y.

PRESSES, Straightening

American Steel Foundries, Elmes Engrg. Div., Paddock Rd. and Tennessee Ave., Cincinnati, Ohio.
 Anderson Bros. Mfg. Co., 1910 Kishwaukee St., Rockford, Ill.
 Baldwin-Lima-Hamilton Corp., Eddystone Div., Philadelphia 42, Pa.
 Chambersburg Engrg. Co., Chambersburg, Pa.
 Colonial Broach Co., P.O. Box 37, Harper Sta., Detroit, Mich.
 Consolidated Mch. Tool Corp., Rochester, N. Y.
 Duke Corp., 604 Seventh St., Grand Haven, Mich.
 Erie Foundry Co., Erie, Pa.
 Hannifin Corp., 501 S. Wolf Rd., Des Plaines, Ill.
 Hydraulic Press Mfg. Co., 300 Lincoln Ave., Mt. Gilead, Ohio.
 Hydropress, Inc., 350 Fifth Ave., New York 1, N. Y.
 Lempro Products, Inc., 5490 Durham Rd., Bedford, Ohio.
 Niagara Machine & Tool Works (Hydraulic), 683 Northland Ave., Buffalo, N. Y.
 Springfield Mch. Tool Co., Springfield, Ohio.
 Verson Allsteel Press Co., 93rd St. & Kenwood Ave., Chicago, Ill.
 Wilson, K. R., Inc., 211 Mill St., Arcade, N. Y.

PROFILE—TRACING ATTACHMENTS

Lehigh Foundries, Inc., 1500 Lehigh Dr., Easton, Pa. (Lathe).

PROFILING MACHINES

Axelson Mfg. Co., 6160 S. Boyle Ave., Los Angeles 58, Cal.
 Cincinnati Milling Mch. Co., Oakley, Cincinnati 9, Ohio.
 Consolidated Mch. Tool Corp., Rochester, N. Y.
 Cosa Corp., 405 Lexington Ave., New York 17, N. Y.
 Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit 32, Mich.
 Frew Machine Co., 121 East Luray St., Philadelphia 20, Pa.
 Gorton, George Machine Co., 1110 W. 13th St., Racine, Wis.
 Morey Machinery Co., Inc., 383 Lafayette St., New York 3, N. Y.
 Onsrud Machine Works, Inc., 3940 Palmer St., Chicago, Ill.
 Pratt & Whitney, West Hartford 1, Conn.
 Sheffield Corp., 721 Springfield St., Dayton 1, Ohio.

PULLEYS

Boston Gear Works, 3200 Main St., North Quincy 71, Mass.

PULLEYS, Friction Clutch

Brown & Sharpe Mfg. Co., Providence, R. I.

PUMPS, Coolant, Lubricant and Oil

Brown & Sharpe Mfg. Co., Providence, R. I.
 Graymills Co., 1948-52 Ridge Ave., Evanston, Ill.
 Ingersoll-Rand Co., Phillipsburg, N. J.
 Logansport Machine Co., Inc., 810 Center Ave., Logansport, Ind.
 Pioneer Pump Div., Detroit Harvester Co., 14300 Tireman Ave., Detroit 28, Mich.
 Ruthman Machinery Co., 1809 Reading Rd., Cincinnati 12, Ohio.
 Sier-Bath Gear & Pump Co., Inc., 9248 Hudson Blvd., North Bergen, N. J.
 South Bend Lathe Works, Inc., 425 E. Madison St., South Bend, Ind.
 Tompkins-Johnson Co., Jackson, Mich.
 Vickers Inc., 1402 Oakman Blvd., Detroit, Mich.
 Viking Pump Co., Cedar Falls, Iowa.

PUMPS, Hydraulic

American Steel Foundries, Elmes Engrg. Div., Paddock Rd. and Tennessee Ave., Cincinnati, Ohio.
 Baldwin-Lima-Hamilton Corp., Eddystone Div., Philadelphia 42, Pa.
 Barnes, John S., Corp., Rockford, Ill.
 Bethlehem Steel Co., Bethlehem, Pa.
 Brown & Sharpe Mfg. Co., Providence, R. I.
 Chambersburg Engrg. Co., Chambersburg, Pa.
 Denison Engrg. Co., 1160 Dublin St., Columbus 16, Ohio.
 Hydraulic Press Mfg. Co., 300 Lincoln Ave., Mt. Gilead, Ohio.
 Hydropress, Inc., 350 Fifth Ave., New York 1, N. Y.
 Ingersoll-Rand Co., Phillipsburg, N. J.
 (Continued on page 524)

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 Sundstrand Machine Tool Co., 2531 11th St., Rockford, Ill.
 Vickers, Inc., 1402 Oakman Blvd., Detroit, Mich.
 Viking Pump Co., Cedar Falls, Iowa.

PUMPS, Pneumatic

Chicago Pneumatic Tool Co., 6 E. 44th St., New York, N. Y.
 Ingersoll-Rand Co., Phillipsburg, N. J.

PUMPS, Rotary

Brown & Sharpe Mfg. Co., Providence, R. I.
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 Sundstrand Machine Tool Co., 2531 11th St., Rockford, Ill.
 Vickers, Inc., 1402 Oakman Blvd., Detroit, Mich.
 Viking Pump Co., Cedar Falls, Iowa.

PUNCHES AND DIES

See Dies, Sheet Metal, Etc.

PUNCHES, Centering

Cleveland Punch & Shear Works Co., 3917 St. Clair Ave., N. E., Cleveland, Ohio.

PUNCHING MACHINERY

Allen, Alva F., Box 426, Clinton, Mo.
 Buffalo Forge Co., 490 Broadway, Buffalo, N. Y.
 Cincinnati Shaper Co., Elam and Garrard Aves., Cincinnati, Ohio.
 Cleveland Punch & Shear Works Co., 3917 St. Clair Ave., N. E., Cleveland, Ohio.
 Consolidated Mch. Tool Corp., Rochester, N. Y.
 Engineering & Research Corp., Riverdale, Md.
 Famca Machine Co., 3134 Sheridan Rd., Kenosha, Wis.
 Ferracute Machine Co., Bridgeton, N. J.
 Hannifin Corp., 501 S. Wolf Rd., Des Plaines, Ill.
 Niagara Mch. & Tool Works, 683 Northland Ave., Buffalo, N. Y.
 Ryerson, Joseph T., & Son Inc., 2558 W. 16th St., Chicago 18, Ill.
 Verson Allsteel Press Co., 93rd St. & S. Kenwood Ave., Chicago, Ill.

Wales-Strippet Corp., North Tonawanda, N. Y.
 Wiedermann Machine Co., 4272 Wissahickon Ave., Philadelphia, Pa.

RACKS, Gear Cut

Amgears, Inc., 6633 W. 65th St., Chicago 38, Ill.
 Boston Gear Works, 3200 Main St., North Quincy 71, Mass.
 Brown & Sharpe Mfg. Co., Providence, R. I.
 Gear Specialties, Inc., 2635 W. Medill Ave., Chicago 47, Ill.
 Hartford Special Mchry. Co., 287 Homestead St., Hartford, Conn.
 Horsburgh & Scott Co., 5114 Hamilton, Cleveland, Ohio.
 Massachusetts Gear & Tool Co., 36 Nassau St., Woburn, Mass.
 Ohio Gear Co., 1333 E. 179th St., Cleveland, Ohio.
 Philadelphia Gear Works, Inc., Erie Ave. and G St., Philadelphia, Pa.
 Stahl Gear & Mch. Co., 3901 Hamilton Ave., Cleveland 14, Ohio.

REAMER HOLDERS

Lipe-Rollway Corp., 806 Emerson Ave., Syracuse, N. Y.
 Besley-Welles Corp., 112 Dearborn Ave., Beloit, Wis.
 Scully-Jones & Co., 1903 Rockwell St., Chicago 8, Ill.
 Warner & Swasey Co., 8701 Carnegie Ave., Cleveland 3, Ohio.

REAMERS

The Atrax Co. (Carbide), 240 Day St., Newton 11, Conn.
 Barber-Colman Co., Rock and Montague, Rockford, Ill.
 Besley-Welles Corp., 112 Dearborn Ave., Beloit, Wis.
 Butterfield Div., Union Twist Drill Co., Derby Line, Vt.
 Carboloy Dept., General Electric Co., Box 237, Roosevelt Park Annex, Detroit 27, Mich.
 Chicago-Latrobe Twist Drill Works, 411 W. Ontario St., Chicago, Ill.
 Cleveland Twist Drill Co., 1242 E. 49th St., Cleveland, Ohio.
 DoAll Co., 254 N. Laurel Ave., Des Plaines, Ill.
 Ex-Call-O Corp., 1200 Oakman Blvd., Detroit 32, Mich.
 Firth Sterling Inc., 3113 Forbes St., Pittsburgh 30, Pa.
 Greenfield Tap & Die Corp., Greenfield, Mass.
 Haynes Stellite Co., Div. Union Carbide & Carbon Corp., 30 E. 42nd St., New York, N. Y.
 Jarvis Corp., Middletown, Conn.
 Lemco Products, Inc., 5490 Dunham Rd., Bedford, Ohio.
 Lipe-Rollway Corp., 806 Emerson Ave., Syracuse, N. Y.
 Mohawk Tools, Inc., 910 E. Main St., Montpelier, Ohio.
 National Twist Drill & Tool Co., & Winter Bros. Co., Rochester, Mich.
 Pratt & Whitney, West Hartford 1, Conn.
 Scully-Jones & Co., 1903 Rockwell St., Chicago 8, Ill.
 Super Tool Co., 21650 Hoover Rd., Detroit 13, Mich.
 Taft-Peirce Mfg. Co., Woonsocket, R. I.
 Union Twist Drill Co., Athol, Mass.
 Whitman & Barnes, 40600 Plymouth Rd., Plymouth, Mich.
 Willey's Carbide Tool Co., 1340 W. Vernor Hwy., Detroit 1, Mich.

REAMERS, Adjustable

Barber-Colman Co., Rock and Montague, Rockford, Ill.
 Besley-Welles Corp., 112 Dearborn Ave., Beloit, Wis.
 Carboloy Dept., General Electric Co., Box 237, Roosevelt Park Annex, Detroit 27, Mich.
 Cleveland Twist Drill Co., 1242 E. 49th St., Cleveland, Ohio.
 Firth Sterling Inc., 3113 Forbes St., Pittsburgh 30, Pa.
 Gairing Tool Co., 21225 Hoover Rd., Detroit 32, Mich.
 Greenfield Tap & Die Corp., Greenfield, Mass.
 McCroskey Tool Corp., 1938 Thomas St., Meadville, Pa.
 Pratt & Whitney, West Hartford 1, Conn.
 Taft-Peirce Mfg. Co., Woonsocket, R. I.
 Union Twist Drill Co., Athol, Mass.
 Wesson Co., 1220 Woodward Heights Blvd., Ferndale, Mich.
 Whitman & Barnes, 40600 Plymouth Rd., Plymouth, Mich.

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 positions.



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Complete description in
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REAMERS, Taper Pin

The Atrax Co. (Carbide), 240 Day St., Newington 11, Conn.
 Besley-Welles Corp., 112 Dearborn Ave., Detroit 1, Mich.
 Butterfield Div., Union Twist Drill Co., Derby Line, Vt.
 Cleveland Twist Drill Co., 1242 E. 49th St., Cleveland 14, Ohio.
 Greenfield Tap & Die Corp., Greenfield, Mass.
 Kaufman Manufacturing Co., Manitowoc, Wis.
 Lipe-Rollway Corp., 806 Emerson Ave., Syracuse, N. Y.
 National Twist Drill & Tool Co., & Winter Bros. Co., Rochester, Mich.
 Pratt & Whitney, West Hartford 1, Conn.
 Union Twist Drill Co., Athol, Mass.
 Whitman & Barnes, 40600 Plymouth Rd., Plymouth, Mich.

REAMING MACHINES

Barnes Drill Co., 814 Chestnut St., Rockford, Ill.
 Buhr Mch. Tool Co., 835 Green St., Ann Arbor, Mich.
 Greaves Machine Tool Co., 2009 Eastern Avenue, Cincinnati, Ohio.
 Hartford Special Machinery Co., 287 Homestead Ave., Hartford 12, Conn.
 Kaufman Manufacturing Co., Manitowoc, Wis.
 Pratt & Whitney, West Hartford 1, Conn.
 Van Norman Co., 3640 Main St., Springfield 7, Mass.

RECORDING INSTRUMENTS

National Acme Co. (for counting), 170 E. 131st St., Cleveland, Ohio.
 Young Mch. Tool Div., Church Rd., Bridgeport, Pa.

REELS, Stock, Standard and Automatic

U. S. Tool Co., Inc., 255 North 18th St., Ampere, N. J.

REFRACTORS, Heat-Treating Furnace

Norton Co., 1 New Bond St., Worcester 6, Mass.

REGULATORS, Temperature

General Electric Co., Schenectady, N. Y.

REMOVERS, Japan, Enamel, Etc.

Oakite Products, Inc., 19 Rector St., New York, N. Y.

RETAINING RINGS FOR BEARINGS, Etc.

Nice Ball Bearing Co., Nicetown, Philadelphia, Pa.
 Walde-Kohinoor, Inc., 4716 Austel Place, Long Island City 1, N. Y.

RHEOSTATS

Allen-Bradley Co., 1326 S. 2nd St., Milwaukee, Wis.
 General Electric Co., Schenectady, N. Y.
 Westinghouse Electric Corp., E. Pittsburgh, Pa.

RIVET SETS

Bethlehem Steel Co., Bethlehem, Pa.
 Cleveland Punch & Shear Works Co., 3917 St. Clair Ave., N. E., Cleveland, Ohio.

RIVETERS, Hydraulic

Bethlehem Steel Co., Bethlehem, Pa.
 Chicago Pneumatic Tool Co., 6 E. 44th St., New York, N. Y.
 Hannifin Corp., 501 S. Wolf Rd., Des Plaines, Ill.

RIVETERS, Pneumatic

Chicago Pneumatic Tool Co., 6 E. 44th St., New York, N. Y.
 Grant Mfg. & Machine Co., 90 Silliman St., Bridgeport 5, Conn.
 Ingersoll-Rand Co., Phillipsburg, N. J.
 Ryerson, Joseph T., & Son, Inc., 2558 W. 16th St., Chicago 18, Ill.
 Wood & Co., R. D. Public Ledger Bldg., Philadelphia, Pa.

RIVETING MACHINES

Buffalo Forge Co., 490 Broadway, Buffalo, N. Y.
 Grant Mfg. & Machine Co., 90 Silliman St., Bridgeport 5, Conn.
 Hannifin Corp., 501 S. Wolf Rd., Des Plaines, Ill.
 Snyder Tool & Engrg. Co., 3400 E. Lafayette, Detroit 7, Mich.
 Tomkins-Johnson Co., Jackson, Mich.

RIVET MAKING MACHINES

Hill Acme Co., 1201 W. 63th St., Cleveland 2, Ohio.
 National Machinery Co., Greenfield and Stanton Sts., Tiffin, Ohio.

RUBBER PRODUCTS

Garlock Packing Co., Palmyra, N. Y.

RULES, Steel

Brown & Sharpe Mfg. Co., Providence, R. I.
 Lufkin Rule Co., Hess Ave., Saginaw, Mich.
 Millers Falls Co., Greenfield, Mass.
 Scherr, George Co., Inc., 200 Lafayette St., New York 12, N. Y.
 Starrett, The L. S. Co., Athol, Mass.

RUST PREVENTIVES

Houghton, E. F., & Co., 303 W. Lehigh Ave., Philadelphia, Pa.
 Oakite Products, Inc., 19 Rector St., New York, N. Y.
 Parker Rust Proof Co., 2194 E. Milwaukee, Detroit 11, Mich.
 Scherr, George Co., Inc., 200 Lafayette St., New York 12, N. Y.

SAND BLAST EQUIPMENT

See Blast Cleaning Equipment

SANDERS

Chicago Pneumatic Tool Co., 6 E. 44th St., New York, N. Y.
 Ingersoll-Rand Co., Phillipsburg, N. J.
 Millers Falls Co., Greenfield, Mass.
 Sundstrand Machine Tool Co., 2531 11th St., Rockford, Ill.

SAW BLADES, Hack

Armstrong-Blum Mfg. Co., 5700 W. Bloomingdale Ave., Chicago, Ill.
 DoAll Co., 254 Laurel Ave., Des Plaines, Ill.
 Millers Falls Co., Greenfield, Mass.
 Simonds Saw & Steel Co., 470 Main St., Fitchburg, Mass.
 Starrett, The L. S. Co., Athol, Mass.
 (Continued on page 526)

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AND ENABLES the users of this machine to vary speed and feed to suit the material being machined.

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CONTRIBUTES to more gear precision with no sacrifice of gear production,

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WITH THE PLEASANT, INVIGORATING HEAT FROM THE UNIQUE

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P.S. In the Summertime with the steam off, the revolving discharge outlets produce a pleasant cooling effect...

The fact that the discharge outlets of the Wing Revolving Heater keep the heated air in constant gentle motion, with no steady sickening blasts of hot air on the workers, is one reason why so many firms are adopting Wing Revolving Heaters as "morale boosters". Employees in these plants work in pleasant, comfortably warmed surroundings, and being comfortable they are more productive.

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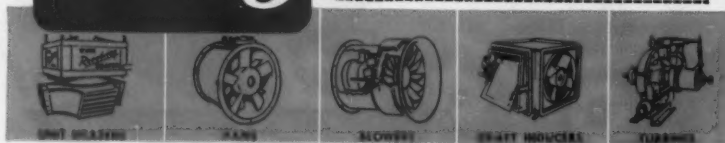
L. J. Wing Mfg. Co. 183 Vreeland Mills Road, Linden, N. J.

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Please send me Bulletin HR-6A-Revolving Heaters

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Address.....
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Espen-Lucas Machine Works, Front St. and Girard Ave., Philadelphia, Pa.
Motch & Merryweather Mchry. Co., Penton Bldg., Cleveland, Ohio.
Scherr, George, Co., Inc., 200 Lafayette St., New York 12, N. Y.

SAWING MACHINES, Circular

Consolidated Mch. Tool Corp., Rochester, N. Y.
Cosa Corp., 405 Lexington Ave., New York 17, N. Y.
Delta Power Tool Div., Rockwell Mfg. Co., 614G N. Lexington Ave., Pittsburgh 8, Pa.
DoAll Co., 254 Laurel Ave., Des Plaines, Ill.
Espen-Lucas Machine Works, Front St. and Girard Ave., Philadelphia, Pa.
Motch & Merryweather Mchry. Co., Penton Bldg., Cleveland, Ohio.
Wallace Tube Co., (Abrasive) 1304-08 Diversey PKwy., Chicago 14, Ill.

SAWING MACHINES, Friction

DoAll Co., 254 Laurel Ave., Des Plaines, Ill.
Ryerson Joseph T., & Son, Inc., 2558 W. 16th St., Chicago 18, Ill.

SAWING MACHINES, Metal Cutting Band

Armstrong-Blum Mfg. Co., 5700 W. Bloomingdale Ave., Chicago, Ill.
DoAll Co., 254 Laurel Ave., Des Plaines, Ill.
Fanco Machine Co., 3134 Sheridan Rd., Kenosha, Wis.
Grab, Inc., Grafton, Wis.
Ryerson Joseph T., & Son, Inc., 2558 W. 16th St., Chicago 18, Ill.
Simonds Saw & Steel Co., 470 Main St., Fitchburg, Mass.
Walker-Turner Div., Kearney & Trecker Corp., South Ave., Plainfield, N. J.

SAWING MACHINES, Power Hack

Armstrong-Blum Mfg. Co., 5700 W. Bloomingdale Ave., Chicago, Ill.
Austin Industrial Corp., 76 Mamaroneck Ave., White Plains, N. Y.
Orban, Kurt & Co., Inc., 205 E. 42nd St., New York 17, N. Y.
Ryerson, Joseph T., & Son Inc., 2558 W. 16th St., Chicago 18, Ill.

SAWS, Circular Metal Cutting

Brown & Sharpe Mfg. Co., Providence, R. I.
Circular Tool Co., Inc., 765 Allens Ave., Providence 5, R. I.
Consolidated Mch. Tool Corp., Rochester, N. Y.
DoAll Co., 254 Laurel Ave., Des Plaines, Ill.
Johnson Mfg. Co., Albion, Mich.
Espen-Lucas Machine Works, Front St. and Girard Ave., Philadelphia, Pa.
Motch & Merryweather Mchry. Co., Penton Bldg., Cleveland, Ohio.
National Twist Drill & Tool Co., & Winter Bros. & Co., Rochester, Mich.
Simonds Saw & Steel Co., 470 Main St., Fitchburg, Mass.
Union Twist Drill Co., Athol, Mass.

SAWS, Metal Cutting Band

Armstrong-Blum Mfg. Co., 5700 W. Bloomingdale Ave., Chicago, Ill.
DoAll Co., 254 Laurel Ave., Des Plaines, Ill.
Ryerson, Joseph T., & Son, Inc., 2558 W. 16th St., Chicago 18, Ill.
Simonds Saw & Steel Co., 470 Main St., Fitchburg, Mass.
Starrett, The L. S., Co., Athol, Mass.

SAWS, Portable Electric

Millers Falls Co., Greenfield, Mass.

SAWS, Screw Slotting

Barber-Colman Co., Rock and Montague, Rockford, Ill.
Brown & Sharpe Mfg. Co., Providence, R. I.
Circular Tool Co., Inc., 765 Allens Ave., Providence 5, R. I.
National Twist Drill & Tool Co., & Winter Bros. Co., Rochester, Mich.
Simonds Saw & Steel Co., 470 Main St., Fitchburg, Mass.
Starrett, The L. S., Co., Athol, Mass.
Union Twist Drill Co., Athol, Mass.

(Continued on page 528)

FACTS

about



NEW DEPARTURE BALL BEARINGS

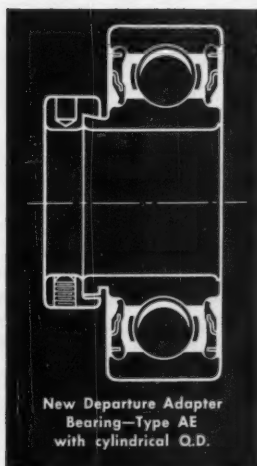


Adapter bearings for fast, easy mountings at low cost!

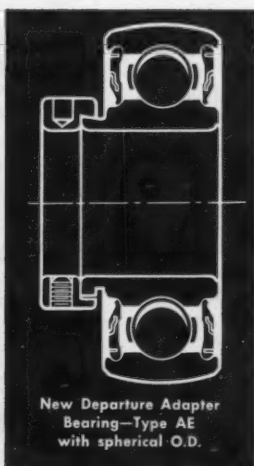
New Departure adapter ball bearings provide inexpensive mountings for many applications.

They are precision bearings, pre-lubricated and efficiently sealed. Also available with stamped flanges, these bearings become complete, initially aligned units for quick assembly.

Designed for moderate loads and speeds and for applications where alignment and concentricity are not critical, the bearings eliminate need for shaft shoulders, ground bearing seats or press fits. The eccentric cam has a self-locking action when tightened against rotation and is intended for uni-directional rotation. New, highly efficient Senti-Seals give the bearings optimum protection against dirt . . . longer life without attention.



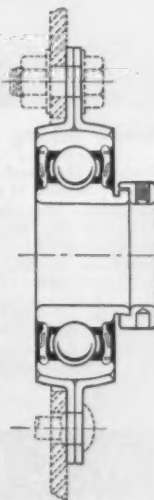
New Departure Adapter
Bearing—Type AE
with cylindrical O.D.



New Departure Adapter
Bearing—Type AE
with spherical O.D.

TYPICAL APPLICATION OF NEW DEPARTURE ADAPTER BEARINGS

New Departure adapter bearings—Type AE—may be used to especial advantage on farm implements and machines operating at moderate speeds. Bearings with loosely assembled flanges are slipped on the shaft and lightly bolted to side plates. After flanges are finally secured, locking collars are tightened in direction opposite rotation and fixed by set screw. Dimensions and load ratings of various adapter bearings are listed in the latest New Departure catalog.



WRITE FOR NEW CATALOG
23rd EDITION

NEW DEPARTURE • DIVISION OF GENERAL MOTORS • BRISTOL, CONN.

For more information on products advertised, use Inquiry Card, page 325

MACHINERY, September, 1955—527

SCRAPERS, Hand and Power

Anderson Bros. Mfg. Co., 1910 Kishwaukee St., Rockford, Ill.

SCREW DRIVERS, Power

Chicago Pneumatic Tool Co., 6 E. 44th St., New York, N. Y.
Ingersoll-Rand Co., Phillipsburg, N. J.

SCREW DRIVING AND NUT SETTING EQUIPMENT

Errington Mechanical Laboratory, Inc., 24 Norwood Ave., Stapleton, S. I., N. Y.
Ingersoll-Rand Co., Phillipsburg, N. J.

SCREW MACHINE TOOLS AND EQUIPMENT

Bardons & Oliver, Inc., Ft. W. 9th St., Cleveland 13, Ohio.
Brown & Sharpe Mfg. Co., Providence, R. I.
Cleveland Automatic Machine Co., 4932 Beech St., Cincinnati 12, Ohio.
Colonial Broach Co., P.O. Box 37, Harper Sta., Detroit 13, Mich.

Gisholt Machine Co., 1245 E. Washington Ave., Madison 10, Wis.
Greenlee Bros. & Co., 12th and Columbia Aves., Rockford, Ill.
Millers Falls Co., Greenfield, Mass.
National Acme Co., 170 E. 131st St., Cleveland, Ohio.
New Britain Mch. Co., New Britain-Gridley Mch. Div., New Britain, Conn.
Potter & Johnson Co., 1027 Newport Ave., Pawtucket, R. I.
R and L Tools, 1825 Bristol St., Philadelphia 40, Pa.
Reed Rolled Thread Die Co., P.O. Box 350, Warner & Swasey Co., 5701 Carnegie Ave., Cleveland 3, Ohio.

SCREW MACHINE WORK

Cleveland Automatic Machine Co., 4932 Beech St., Cincinnati 12, Ohio.
Eastern Mch. Screw Corp., New Haven, Conn.
Mueller Brass Co., Port Huron 35, Mich.
National Acme Co., 170 E. 131st St., Cleveland, Ohio.
Ottemiller, M. H., Co., York, Pa.
Standard Pressed Steel Co., Jenkintown, Pa.
Wicaco Mch. Corp., Wayne Junction, Philadelphia, Pa.

SCREW MACHINES, Automatic Single and Multiple Spindle

Brown & Sharpe Mfg. Co., Providence, R. I.
Cleveland Automatic Machine Co., 4932 Beech St., Cincinnati 12, Ohio.
Cone Automatic Mch. Co., Inc., Windsor, Vt.
Cosa Corp., 405 Lexington Ave., New York 17, N. Y.
Gorton, George, Mch. Co., 1110 W. 13th St., Racine, Wis.
Greenlee Bros. & Co., 12th and Columbia Aves., Rockford, Ill.
National Acme Co., 170 E. 131st St., Cleveland, Ohio.
New Britain Mch. Co., New Britain-Gridley Mch. Div., New Britain, Conn.
Orban, Kurt & Co., Inc., 205 E. 42nd St., New York 17, N. Y.
Scherr, George, Co., Inc., 200 Lafayette St., New York 12, N. Y.
Warner & Swasey Co., 5701 Carnegie Ave., Cleveland 3, Ohio.

SCREW MACHINES, Hand

See also Lathes, Turret
Bardons & Oliver, Inc., Ft. W. 9th St., Cleveland 13, Ohio.
Brown & Sharpe Mfg. Co., Providence, R. I.
Gisholt Machine Co., 1245 E. Washington Ave., Madison 10, Wis.
Hardinge Bros., Inc., 1418 College Ave., Elmira, N. Y.
Orban, Kurt & Co., Inc., 205 E. 42nd St., New York 17, N. Y.
Rivett Lathe & Grinder, Inc., Brighton, Boston 35, Mass.
Simmons Machine Tool Corp., Albany, N. Y.
Warner & Swasey Co., 5701 Carnegie Ave., Cleveland 3, Ohio.

SCREW PLATES

Butterfield Div., Union Twist Drill Co., Derby Line, Vt.
Card, S. W., Mfg. Co., Div. Union Twist Drill Co., Mansfield, Mass.
Greenfield Tap & Die Corp., Greenfield, Mass.
Pratt & Whitney, West Hartford 1, Conn.
Threadwell Tap & Die Co., Greenfield, Mass.
Winter Bros. Co., Rochester, Mich.

SCREWS, Cap, Set, Safety Set and Machine, Etc.

Allen Mfg. Co., 133 Sheldon St., Hartford 2, Conn.
Chicago Screw Co., Bellwood, Ill.
Lemaco Products, Inc., 5490 Dunham Rd., Bedford, Ohio.
National Acme Co., 170 E. 131st St., Cleveland, Ohio.
Ottemiller, W. H., Co., York, Pa.
Parker-Kalon Div., General American Transportation Corp., 200 Varick St., New York, N. Y.
Russell, Burdall & Ward Bolt & Nut Co., 100 Midland Ave., Port Chester, N. Y.
Standard Pressed Steel Co., Jenkintown, Pa.

SCREWS, Self-tapping, Drive

Parker-Kalon Div., General American Transportation Corp., 200 Varick St., New York, N. Y.

SCREWS, Thumb

Parker-Kalon Div., General American Transportation Corp., 200 Varick St., New York, N. Y.
Russell, Burdall & Ward Bolt & Nut Co., 100 Midland Ave., Port Chester, N. Y.
Williams, J. H. & Co., 400 Vulcan St., Buffalo 7, N. Y.

SEALS AND RETAINERS, Oil or Grease

Chicago Rawhide Mfg. Co., 1301 Elston Ave., Chicago 22, Ill.
Crane Packing Co., 1800 Cuyler Ave., Chicago, Ill.
Garlock Packing Co., Palmyra, N. Y.

SECOND-HAND MACHINERY, Etc.

Eastern Machinery Co., 1006 Tennessee Ave., Cincinnati 22, Ohio.
Miles Machinery Co., Box 770, Saginaw, Mich.
Morey Machinery Co., Inc., 383 Lafayette St., New York 3, N. Y.
Simmons Machine Tool Corp., Albany, N. Y.

SEPARATORS, Centrifugal

De Laval Separator Co., Poughkeepsie, N. Y.

SEPARATORS, Oil or Coolant

Barnes Drill Co. (Magnetic), 814 Chestnut, Rockford, Ill.
National Acme Co., 170 E. 131st St., Cleveland, Ohio.

SHAFTING, Steel

Bethlehem Steel Co., Bethlehem, Pa.
Cumberland Steel Co., Cumberland, Md.
De Laval Separator Co., Poughkeepsie, N. Y.
Ryerson, Jos. T., & Son, Inc., 2558 W. 16th St., Chicago 18, Ill.

(Continued on page 530)

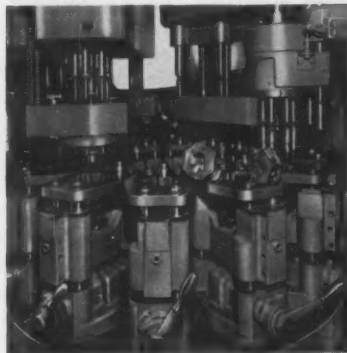
MILLHOLLAND

12-Station Vertical**Indexing Machine**

34 Spindles!

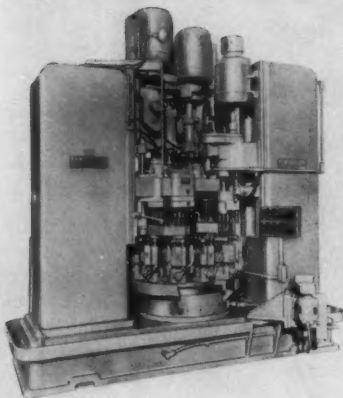
93 Pieces per Hour!

Here is Millholland versatility in action!

**Unique Holding Fixture**

With a 31-second cycle time, this machine produces 93 pieces per hour at 80% efficiency! This chip cutting efficiency is made possible by the distinctive design of the plate type cam used in Millholland Automatic Units, plus the action of the pneumatic counterbalance.

Two No. 5 Units are mounted vertically, the first with 22 spindles, the second with 5; a No. 2 unit is mounted horizontally on a rapid travel slide, and an Automatic



Lead Screw Tapper with reversing motor drives a 6-spindle tapping head. All machine elements are electrically synchronized, with push-button control for "cycle start," automatic single cycle, set-up and emergency stop. Chip disposal is simplified with wiper blades rotating within a ring on the index table to bring chips to a removable pan.

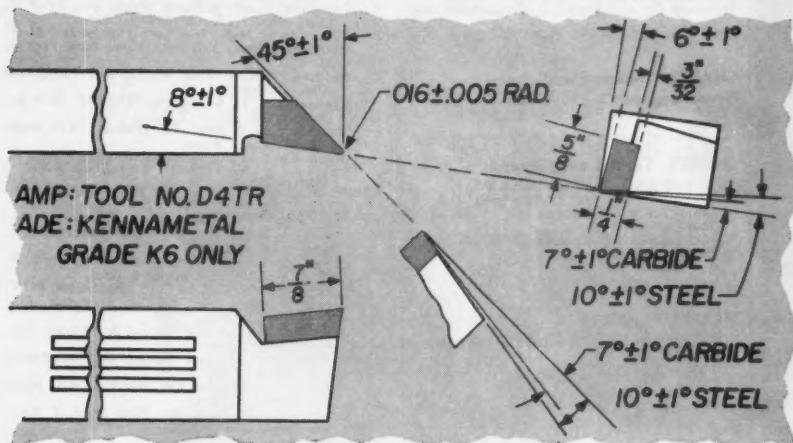
Part requirements dictated location using self-centering horizontal vees with up-acting clamps, actuated by a single handle operating through a small arc. Fixtures also contain register pins for all bushing plates. The 12 fixtures are mounted on an independently powered automatic index table with self-contained lubrication pump.

A complex production problem, solved efficiently with Millholland equipment and Millholland know-how.

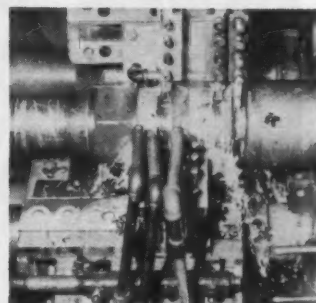
Write for Bulletin M-9 giving further details.

W. K. MILLHOLLAND MACHINERY CO.
6402 Westfield Blvd. Indianapolis 20, Indiana

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**PROVED BEST
TEST AFTER TEST**



Grade K2S—Rough turning SAE steel housing assemblies reduced from 45 to 18 minutes each.

PINPOINT THE RIGHT GRADE of carbide for each operation when you make up your prints

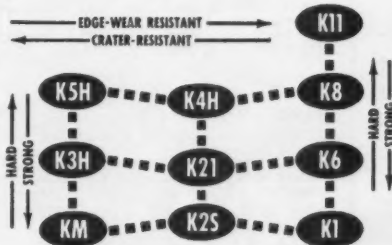
Consistent carbide performance is a must in keeping production lines moving and costs under control. Even brief shutdowns, or shortages along the line due to tool trouble, can send costs zooming... at station after station... until the added costs far exceed that of the best carbide available. So it pays to get the best.

How do you get the best?

The only way, of course, is to specify the grade found best for each operation—the grade that does the best job by providing:

1. The most pieces per grind
2. The longest life per tool or per insert
3. The most consistent repeat performance—regrind after regrind or insert after insert.

When you specify Kennametal* tooling, you can depend on top performance... consistently... from the first run, through each regrind, tool after tool. It helps you forecast performance with assurance because every Kennametal grade has high reserve strength... the strength needed to stand up to wide variations in materials and machines.

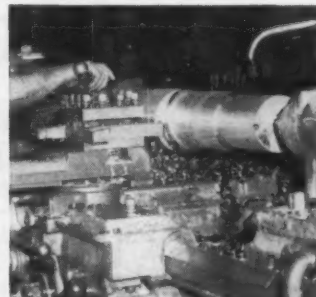


Kennametal helps keep production flowing.

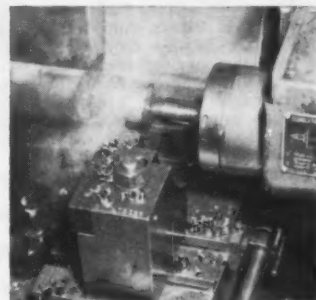
To be sure of the best performance, specify Kennametal. But be specific... specify by grade. Once you have the grade pegged for a job, show it on the print... added protection that will help you realize dividends through increased production.

A Kennametal Tool Engineer will help you select the right grade of Kennametal for each operation. He works exclusively with Kennametal... applying and servicing it. His specialized experience could be of great value to you. KENNAMETAL INC., Latrobe, Pa.

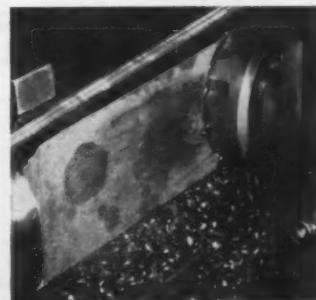
*Registered Trademark



Grade K2S—Floor to floor time reduced 34% for machining ends of steel drive shafts, requiring 9 passes.

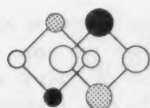


Grade 3H—Kennametal tooling reduces machining time 60% on chrome-nickel-moly bar stock.



Grade K2S—10 times longer cutting life, with 8 times faster speed and feed with Kennamill* milling.

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Available now in 148 low-cost standard sizes to meet your exact requirements!

"Versatile!" Yes, that's one word for Ace Drill Blanks. And "economical" is another. Because they're "all-purpose" tools that you can readily use in countless different ways. Properly heat-treated to uniform hardness, then precision ground to size, they're ideal as punches, dowels, knock-out pins, and gages. Perfect for rollers, too, on high temperature applications. And you'll find they can be quickly, easily, economically adapted to a wide range of end-cutting tool applications to save time, step up production, and reduce costs! Call your local distributor . . . or send for complete information today!

ACE DRILL CORPORATION Adrian, Michigan

Gentlemen: Please send me your Catalog No. 52-D containing complete information on ACE "Ground-from-the-Solid" Drills and hardened H.S.S. drill blanks.

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COMPANY _____

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ADRIAN, MICHIGAN

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SHAFTS

Jarvis Corp., Middletown, Conn.
National Forge & Ordnance Co., Irvine, Warren County, Pa.
Standard Pressed Steel Co., Jenkintown, Pa.

SHAFTS, Hollow-Bored

Bethlehem Steel Co., Bethlehem, Pa.

SHAFTS, Turned and Ground

Bethlehem Steel Co., Bethlehem, Pa.
Cumberland Steel Co., Cumberland, Md.
National Forge & Ordnance Co., Irvine, Warren County, Pa.
Ryerson, Jos. T., & Son, Inc., 2558 W. 16th St., Chicago 18, Ill.

SHAPER-PLANERS

Rockford Mch. Tool Co., 2500 Kishwaukee St., Rockford, Ill.
Young Mch. Tool Div., Church Rd., Bridgeport, Pa.

SHAPERS

American Tool Works Co., Pearl and Eggleston Ave., Cincinnati, Ohio.
Atlas Press Co., Kalamazoo, Mich.
Austin Industrial Corp., 76 Mamaroneck Ave., White Plains, N. Y.
Barber-Colman Co. (Hendey Mch. Div.) Rockford, Ill.
Cincinnati Shaper Co., Elam and Garrard Aves., Cincinnati, Ohio.
Gould & Eberhardt Inc., Newark, N. J.
Morton Mfg. Co., Muskegon Heights, Mich.
Onsrud Machine Works, Inc., 3940 Palmer St., Chicago, Ill.
Orban, Kurt & Co., Inc., 205 E. 42nd St., New York 17, N. Y.
Rockford Mch. Tool Co., 2500 Kishwaukee St., Rockford, Ill.
Sheldon Mch. Co., Inc., 4240-4258 N. Knox Ave., Chicago 41, Ill.
Smith & Mills Shapers, Inc., Div. Hamilton-Thomas Corp., Hamilton, O.
South Bend Lathe Works, Inc., 425 E. Madison St., South Bend, Ind.

SHAPERS, Vertical

Austin Industrial Corp., 76 Mamaroneck Ave., White Plains, N. Y.
Pratt & Whitney, West Hartford 1, Conn.
Rockford Mch. Tool Co., 2500 Kishwaukee St., Rockford, Ill.

SHAPES, Structural

Bethlehem Steel Co., Bethlehem, Pa.
U. S. Steel Corp., (Carnegie-Illinois Steel Corp., Div. Columbia Steel Co., Div. Tennessee Coal, Iron & R. R. Co., Div.), 436 7th Ave., Pittsburgh, Pa.

SHEARING MACHINERY

American Pullmax Co., Inc., 2627 N. Western Ave., Chicago 47, Ill.
Bethlehem Steel Co., Bethlehem, Pa.
Buffalo Forge Co., 490 Broadway, Buffalo, N. Y.
Cincinnati Shaper Co., Elam and Garrard Aves., Cincinnati, Ohio.
Cleveland Crane & Engrg. Co., Wickliffe, Ohio.
Cleveland Punch & Shear Works Co., 3917 St. Clair Ave., N. E. Cleveland, Ohio.
Consolidated Mch. Tool Corp., Rochester, N. Y.
Ferracute Machine Co., Bridgeton, N. J.
Hannifin Corp., 501 S. Wolf Rd., Des Plaines, Ill.
Hydrex, Inc., 350 Fifth Ave., New York 1, N. Y.
Niagara Mch. & Tool Works, 683 Northland Ave., Buffalo, N. Y.
Ryerson, Jos. T., & Son, Inc., 2558 W. 16th St., Chicago 18, Ill.
Verson Allsteel Press Co., 93rd St. & S. Kenwood Ave., Chicago, Ill.
Yoder Co., 550 Walworth Ave., Cleveland, Ohio.

SHEARS, Alligator

Hill Acme Co., 1201 W. 65th St., Cleveland 2, Ohio.
Hydrex, Inc., 350 Fifth Ave., New York 1, N. Y.

SHEARS, Rotary

Bliss, E. W., Co., 1375 Raff Rd., S. W., Canton, Ohio.
Brown & Sharpe Mfg. Co., Providence, R. I.
Cleveland Punch & Shear Works Co., 3917 St. Clair Ave., N. E. Cleveland, Ohio.
Consolidated Mch. Tool Corp., Rochester, N. Y.
Hydrex, Inc., 350 Fifth Ave., New York 1, N. Y.
Niagara Mch. & Tool Works, 683 Northland Ave., Buffalo, N. Y.
Ryerson, Jos. T., & Son, Inc., 2558 W. 16th St., Chicago 18, Ill.
Simonds Saw & Steel Co. (Knives), 470 Main St., Fitchburg, Mass.
Union Twist Drill Co., Athol, Mass.

SHEARS, Squaring

Cincinnati Shaper Co., Elam and Garrard Aves., Cincinnati, Ohio.
Cleveland Punch & Shear Works Co., 3917 St. Clair Ave., N. E. Cleveland, Ohio.
Consolidated Mch. Tool Corp., Rochester, N. Y.
Famco Machine Co., 3134 Sheridan Rd., Kenosha, Wis.
Hamilton Div. of the Lodge & Shipley Co., Hamilton 1, Ohio.
Niagara Mch. & Tool Works, 683 Northland Ave., Buffalo, N. Y.
Simonds Saw & Steel Co. (Blades), 470 Main St., Fitchburg, Mass.
Verson Allsteel Press Co., 93rd St. & S. Kenwood Ave., Chicago, Ill.

SHEET METALS

American Brass Co., 25 Broadway, New York, N. Y.
Bethlehem Steel Co., Bethlehem, Pa.
New Jersey Zinc Co., 160 Front St., New York, N. Y.
Ryerson, Jos. T., & Son, Inc., 2558 W. 16th St., Chicago 18, Ill.
U. S. Steel Corp., (Carnegie-Illinois Steel Corp., Div. Columbia Steel Co., Div. Tennessee Coal, Iron & R. R. Co., Div.), 436 7th Ave., Pittsburgh, Pa.

SHEET METAL MACHINES, Shrinking, Stretching, Forming & Flanging.

Engineering & Research Corp., Riverdale, Md.

SHEETS, Iron and Steel

Allegheny Ludlum Steel Corp., Pittsburgh, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Ryerson, Jos. T., & Son, Inc., 2558 W. 16th St., Chicago 18, Ill.
U. S. Steel Corp., (Carnegie-Illinois Steel Corp., Div. Columbia Steel Co., Div. Tennessee Coal, Iron & R. R. Co., Div.), 436 7th Ave., Pittsburgh, Pa.

SHIMS

Laminated Shim Co., Inc., Glenbrook, Conn.

SLEEVES

Cleveland Twist Drill Co., 1242 E. 49th St., Cleveland, Ohio.
Greenfield Tap & Die Corp., Greenfield, Mass.
Haynes Steelite Div., Union Carbide & Carbon Corp., 30 E. 42nd St., New York, N. Y.
National Twist Drill & Tool Co., Rochester, Mich.
Pratt & Whitney, West Hartford 1, Conn.
Scully-Jones & Co., 1903 Rockwell St., Chicago 8, Ill.
Union Twist Drill Co., Athol, Mass.

SLOTING MACHINES

Baker Bros., Inc., Station F, P.O. Box 101, Toledo 10, Ohio.
Consolidated Mch. Tool Corp., Rochester, N. Y.
Lobell United Div., United Engrg. & Foundry Co., Wilmington 99, Del.
Rockford Mch. Tool Co., 2500 Kishwaukee St., Rockford, Ill.
Roy Machinery & Sales, Inc., 5 New Britain Ave., Farmington, Conn.

SOCKETS

Armstrong Bros. Tool Co., 5200 W. Armstrong Ave., Chicago, Ill.
Chicago-Latrobe Twist Drill Wks., 411 W. Ontario St., Chicago, Ill.
Cleveland Twist Drill Co., 1242 E. 49th St., Cleveland, Ohio.
Greenfield Tap & Die Corp., Greenfield, Mass.
National Twist Drill & Tool Co., Rochester, Mich.

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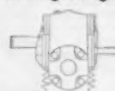
Horizontal Right Angle Drive
Worm gear on top



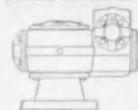
Horizontal Right Angle Drive
Worm gear under



Vertical Right Angle Drive



Horizontal Parallel Drive
Double Reduction



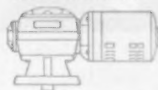
Vertical Right Angle Drive
Double Reduction



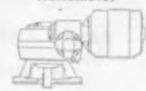
Horizontal Right Angle
Ratiomotor



Horizontal Parallel
Ratiomotor
Double Reduction



Vertical Right Angle
Ratiomotor



Vertical Right Angle
Ratiomotor
Double Reduction

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MACHINERY, September, 1955—531

Pratt & Whitney, West Hartford 1, Conn.
 Scully-Jones & Co., 1903 Rockwell St., Chicago 8, Ill.
 Union Twist Drill Co., Athol, Mass.
 Williams, J. H. & Co., 400 Vulcan St., Buffalo 7, N. Y.

SPECIAL MACHINERY AND TOOLS

American Steel Foundries, Elmes Engrg. Div., Paddock Rd. and Tennessee Ave., Cincinnati, Ohio.
 Axelson Mfg. Co., 6160 S. Boyle Ave., Los Angeles 58, Cal.
 Baird Machine Co., 1700 Stratford Ave., Stratford, Conn.
 Baldwin-Lima-Hamilton Corp., Eddystone Div., Philadelphia 42, Pa.
 Baldwin-Lima-Hamilton Corp., Lima Hamilton Div., Hamilton, Ohio.
 Baker Bros., Inc., Sta. F., P.O. Box 101, Toledo 10, Ohio.
 Barnes Drill Co., 814 Chestnut, Rockford, Ill.
 Barnes, W. F. & John Co., 201 S. Water St., Rockford, Ill.
 Bausch Machine Tool Co., 156 Wason Ave., Springfield 7, Mass.
 Bethlehem Steel Co., Bethlehem, Pa.
 Bilgram Gear & Mch. Works, 1217-35 Spring Garden St., Philadelphia, Pa.
 Birdsboro Steel Fdy. & Mch. Co., Birdsboro, Pa.
 Blanchard Mch. Co., 64 State St., Cambridge, Mass.
 Bliss, E. W. Co., 1375 Raff Rd., S. W., Canton, Ohio.
 Buhr Mch. Tool Co., 835 Green St., Ann Arbor, Mich.
 Chambersburg Engrg. Co., Chambersburg, Pa.
 Cincinnati Milling Mch. Co., Oakley, Cincinnati 9, Ohio.
 Colonial Broach Co., P.O. Box 37, Harper St., Detroit 13, Mich.
 Columbus Die-Tool & Mch. Co., 955 Cleveland Ave., Columbus, Ohio.
 Consolidated Mch. Tool Corp., Rochester, N. C.
 Coulter, James, Machine Co., Bridgeport 5, Conn.
 Cross Co., Detroit, Mich.
 Erie Foundry Co., Erie, Pa.
 Espen-Lucas Mch. Works, Front St. and Girard Ave., Philadelphia, Pa.
 Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit 32, Mich.

Farrel-Birmingham Co., Inc., 25 Main St., Ansonia, Conn.
 Federal Machine & Welder Co., Overland Ave., Warren, Ohio.
 Fellows Gear Shaper Co., 78 River St., Springfield, Vt.
 Frew Machine Co., 121 East Luray St., Philadelphia 20, Pa.
 Gisholt Machine Co., 1245 E. Washington Ave., Madison 10, Wis.
 Gorton, Geo., Mch. Co., 1110 W. 13th St., Racine, Wis.
 Grant Mfg. & Mch. Co., 90 Silliman St., Bridgeport 5, Conn.
 Greenlee Bros. & Co., 12th and Columbia Aves., Rockford, Ill.
 Hannifin Corp., 501 S. Wolf Rd., Des Plaines, Ill.
 Hartford Special Mchry. Co., 287 Homestead St., Hartford, Conn.
 Hill Acme Co., 1201 W. 65th St., Cleveland 2, Ohio.
 Hydraulic Press Mfg. Co., 30 Lincoln Ave., Mt. Gilead, Ohio.
 Hydropress, Inc., 350 Fifth Ave., New York 1, N. Y.
 Ingersoll Milling Mch. Co., 2442 Douglas St., Rockford, Ill.
 Kingsbury Mch. Tool Corp., Keene, N. H.
 Knight, W. B., Machine Co., St. Louis, Mo.
 Lake Erie Engrg. Corp., Kenmore Station, Buffalo, N. Y.
 La Salle Tool Co., Inc., 3840 E. Outer Drive, Detroit 34, Mich.
 Lemert Engrg. Co., Inc., 210 E. Jefferson St., Plymouth, Ind.
 Lempeco Products, Inc., 5490 Dunham Rd., Bedford, Ohio.
 Lipe-Rollway Corp., 806 Emerson Ave., Syracuse, N. Y.
 Mercury Engrg. Corp., Milwaukee, Wis.
 Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich.
 Millholland, W. K. Machinery Co., 6402 Westfield Blvd., Indianapolis 5, Ind.
 Modern Industrial Engrg. Co., 14230 Birwood, Detroit 4, Mich.
 Moline Tool Co., 102 20th St., Moline, Ill.
 Morris Machine Tool Co., Inc., 946-M Harriet St., Cincinnati 3, Ohio.
 Match & Merryweather Mchry. Co., Penton Bldg., Cleveland, Ohio.
 National Acme Co., 170 E. 131st St., Cleveland, Ohio.
 National Automatic Tool Co., Inc., 5 7th and N Sts., Richmond, Ind.

National Broach & Mch. Co., 5600 St. Jean Ave., Detroit 2, Mich.
 National Twist Drill & Tool Co., Rochester, Mich.
 New Britain Mch. Co., New Britain-Gridley Mch. Div., New Britain, Conn.
 New Jersey Gear & Mfg. Co., 1470 Chestnut Ave., Hillside, N. J.
 Niagara Mch. & Tool Works, 683 Northland Ave., Buffalo, N. Y.
 Oilgear Co., 1569 W. Pierce St., Milwaukee, Wis.
 Pratt & Whitney, West Hartford 1, Conn.
 Rivett Lathe & Grinder, Inc., Brighton, Boston 35, Mass.
 Seneca Falls Mch. Co., Seneca Falls, N. Y.
 Snyder Tool & Engrg. Co., 3400 E. Lafayette, Detroit 7, Mich.
 Sundstrand Mch. Tool Co., 2531 11th St., Rockford, Ill.
 Swanson Tool & Machine Products, Inc., 854 E. 8th St., Erie, Pa.
 Taft-Peirce Mfg. Co., Woonsocket, R. I.
 Turchan Follower Machine Co., 8259 Livernois & Alaska Aves., Detroit, Mich.
 Union Twist Drill Co., Athol, Mass.
 Universal Engrg. Co., Frankenthuth 2, Mich.
 Verson Allsteel Press Co., 93rd St. & S. Kenwood Ave., Chicago, Ill.
 Waltham Machine Works, Newton St., Waltham, Mass.
 Wicaco Mch. Corp., Wayne Junction, Philadelphia, Pa.
 Zagar Tool Co., 24000 Lakeland Blvd., Cleveland 23, Ohio.

SPEED REDUCERS

Boston Gear Work, 320 Main St., North Quincy 71, Mass.
 Cleveland Worm & Gear Co., 3249 E. 80th St., Cleveland, Ohio.
 Cone-Drive Gears, Div., Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich.
 Farrel-Birmingham Co., Inc., 25 Main St., Ansonia, Conn.
 General Electric Co., Schenectady, N. Y.
 Harsburgh & Scott Co., 5114 Hamilton, Cleveland, Ohio.
 Oilgear Co., 1569 W. Pierce St., Milwaukee, Wis.
 Philadelphia Gear Works, Inc., Erie Ave. and G St., Philadelphia, Pa.
 Twin Disc Clutch Co., 1361 Racine St., Racine, Wis.
 Westinghouse Electric Corp., E. Pittsburgh, Pa.

SPINDLES, Boring and Milling

Pope Mchry. Corp., Haverhill, Mass.

SPINDLES, Grinding

Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit 32, Mich.
 Pope Mchry. Corp., Haverhill, Mass.
 Taft-Peirce Mfg. Co., Woonsocket, R. I.

SPINNING LATHES

See Chucking Machines.

SPROCKET CHAINS

Boston Gear Work, 3200 Main St., North Quincy 71, Mass.
 Philadelphia Gear Works, Inc., Erie Ave. and G St., Philadelphia, Pa.

SPROCKETS

Boston Gear Work, 3200 Main St., North Quincy 71, Mass.
 Hartford Special Mchry. Co., 287 Homestead St., Hartford, Conn.
 Philadelphia Gear Works, Inc., Erie Ave. and G St., Philadelphia, Pa.
 Stahl Gear & Mch. Co., 3901 Hamilton Ave., Cleveland 14, Ohio.

STAMPINGS, Sheet Metal

Laminated Shim Co., Inc., Glenbrook, Conn.
 Revere Copper & Brass Inc., 230 Park Ave., New York, N. Y.

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Allegheny Ludlum Steel Corp., Pittsburgh, Pa.
 American Steel & Wire Co., Div. U. S. Steel Corp., Rockefeller Bldg., Cleveland, Ohio.
 Bethlehem Steel Co., Bethlehem, Pa.
 Carpenter Steel Co., Reading, Pa.
 Crucible Steel Co. of America, Oliver Bldg., Pittsburgh 30, Pa.

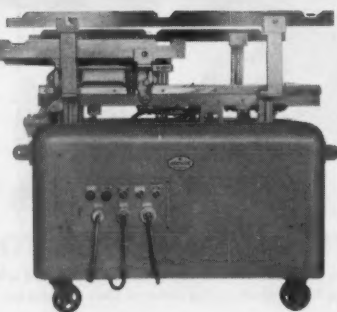
(Continued on page 534)



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 INDEX
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Wheeler-Lovejoy & Co., Inc., Cambridge, Mass.

STEEL, Cold Drawn

Allegheny Ludlum Steel Corp., Pittsburgh, Pa.
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Bethlehem Steel Co., Bethlehem, Pa.
Crucible Steel Co. of America, Oliver Bldg., Pittsburgh 30, Pa.
Firth Sterling Inc., 3113 Forbes St., Pittsburgh 30, Pa.
Ryerson, Jos. T., & Son, Inc., 2558 W. 16th St., Chicago 18, Ill.
Timken Roller Bearing Co., Canton, Ohio.
U. S. Steel Corp., (American Steel & Wire Co. Div., 436 7th Ave., Pittsburgh, Pa.
Wheeler-Lovejoy & Co., Inc., Cambridge, Mass.

STEEL, High Speed Tool

Allegheny Ludlum Steel Corp., Pittsburgh, Pa.
Armstrong Bros. Tool Co., 5200 Armstrong Ave., Chicago, Ill.
Bethlehem Steel Co., Bethlehem, Pa.
Carpenter Steel Co., Reading, Pa.
Crucible Steel Co. of America, Oliver Bldg., Pittsburgh 30, Pa.
Firth Sterling Inc., 3113 Forbes St., Pittsburgh 30, Pa.
Ryerson, Jos. T., & Son, Inc., 2558 W. 16th St., Chicago 18, Ill.
Simonds Saw & Steel Co., 470 Main St., Fitchburg, Mass.
Vanadium Alloys Steel Co., Latrobe, Pa.
Wheeler-Lovejoy & Co., Inc., Cambridge, Mass.

STEEL, Machine

Bethlehem Steel Co., Bethlehem, Pa.
Carpenter Steel Co., Reading, Pa.
Crucible Steel Co. of America, Oliver Bldg., Pittsburgh 30, Pa.
Ryerson, Jos. T., & Son, Inc., 2558 W. 16th St., Chicago 18, Ill.
Timken Roller Bearing Co., Canton, Ohio.
Wheeler-Lovejoy & Co., Inc., Cambridge, Mass.

STEEL, Stainless

Allegheny Ludlum Steel Corp., Pittsburgh, Pa.
American Steel & Wire Co., Div. U. S. Steel Corp., Rockefeller Bldg., Cleveland, Ohio.
Bethlehem Steel Co., Bethlehem, Pa.
Carpenter Steel Co., Reading, Pa.
Crucible Steel Co. of America, Oliver Bldg., Pittsburgh 30, Pa.
Firth Sterling Inc., 3113 Forbes St., Pittsburgh 30, Pa.
Ryerson, Jos. T., & Son, Inc., 2558 W. 16th St., Chicago 18, Ill.
Timken Roller Bearing Co., Canton, Ohio.
U. S. Steel Corp., (American Steel & Wire Co. Div., Carnegie-Illinois Steel Corp., Div., 436 7th Ave., Pittsburgh, Pa.
Wheeler-Lovejoy & Co., Inc., Cambridge, Mass.

STEEL, Strip and Sheet

Allegheny Ludlum Steel Corp., Pittsburgh, Pa.
American Steel & Wire Co., Div. U. S. Steel Corp., Rockefeller Bldg., Cleveland, Ohio.
Bethlehem Steel Co., Bethlehem, Pa.
Ryerson, Jos. T., & Son, Inc., 2558 W. 16th St., Chicago 18, Ill.
U. S. Steel Corp., (American Steel & Wire Co. Div., Carnegie-Illinois Steel Corp., Div., Columbia Steel Co. Div., Tennessee Coal, Iron & R. R. Co. Div.), 436 7th Ave., Pittsburgh, Pa.

STEEL, Tool and Die

Allegheny Ludlum Steel Corp., Pittsburgh, Pa.
Carpenter Steel Co., Reading, Pa.
Crucible Steel Co. of America, Oliver Bldg., Pittsburgh 30, Pa.
Firth Sterling Inc., 3113 Forbes St., Pittsburgh 30, Pa.
Simonds Saw & Steel Co., 470 Main St., Fitchburg, Mass.
Vanadium Alloys Steel Co., Latrobe, Pa.

STEEL, Zinc, Tin and Copper Coated Strip

Allegheny Ludlum Steel Corp., Pittsburgh, Pa.

STEEL ALLOYS

See Alloys, Steel

STEEL BARS

See Bars, Steel

STEEL STOCK GROUND FLAT

Brown & Sharpe Mfg. Co., Providence, R. I.
Starrett, The L. S. Co., Athol, Mass.

STELLITE

Haynes Stellite Div., Union Carbide & Carbon Corp. (Alloy), 30 E. 42nd St., New York, N. Y.

STOCKS, Die

Armstrong Bros. Tool Co., 5200 W. Armstrong Ave., Chicago, Ill.
Butterfield Div., Union Twist Drill Co., Derby Line, Vt.
Card, S. W., Mfg. Co., Div. of Union Twist Drill Co., Mansfield, Mass.
Greenfield Tap & Die Corp., Greenfield, Mass.
Pratt & Whitney, West Hartford 1, Conn.
Threadwell Tap & Die Co., Greenfield, Mass.

STONES, Oil or Sharpening

Carborundum Co., Buffalo Ave., Niagara Falls, N. Y.
Norton Co., 1 New Bond St., Worcester 6, Mass.

STOOLS

Standard Pressed Steel Co., Jenkintown, Pa.

STRAIGHTEDGES

Starrett, The L. S. Co., Athol, Mass.
Taft-Peirce Mfg. Co., Woonsocket, R. I.

STRAIGHTENERS, Flat Stock and Wire

U. S. Tool Co., Inc., 255 North 18th St., Amper, N. J.

STRAIGHTENING MACHINERY

American Steel Foundries, Elmes Engrg. Div., Paddock Rd. and Tennessee Ave., Cincinnati, Ohio.
Baldwin-Lima-Hamilton Corp., Eddystone Div., Philadelphia 42, Pa.
Chambersburg Engrg. Co., Chambersburg, Pa.
Colonial Broach Co., P.O. Box 37, Harper Sta., Detroit 13, Mich.
Consolidated Mch. Tool Corp., Rochester, N.Y.
Hannifin Corp., 501 S. Wolf Rd., Des Plaines, Ill.
Hydraulic Press Mfg. Co., 300 Lincoln Ave., Mt. Gilead, Ohio.
Hydrex, Inc., 350 Fifth Ave., New York 1, N. Y.
Lake Erie Engrg. Corp., Kenmore Station, Buffalo, N. Y.
Springfield Mch. Tool Co., Springfield, Ohio.
Verson Allsteel Press Co., 93rd St. & S. Kenwood Ave., Chicago, Ill.

(Continued on page 536)



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(Standard
or Oversize)



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(3 Pressure Ranges)



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FLAT HEAD
CAP SCREWS



STRIPPER
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POSTS



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CLAMPS



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Tool bits have to be tough to withstand the strain of machining modern materials. But, toughness without adequate heat resistance and wear resistance leads only to short cutting life.

The special steel used in duMont Tool Bits gives them an almost perfect balance of toughness, red hardness and wear resistance. They fill a crying need for tool bits that will keep a keen cutting edge longer.

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duMONT High Speed Ground TOOL BITS Square and Rectangular

The duMONT CORPORATION
Greenfield, Massachusetts

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Errington Mechanical Laboratory Inc., 24 Norwood Ave., Stapleton, S. I., N. Y.

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Waltham Machine Works, Newton St., Waltham, Mass.

SUPERFINISHING MACHINES

Gisholt Machine Co., 1245 E. Washington Ave., Madison 10, Wis.

SURFACE CHECKING EQUIPMENT

Micrometrical Mfg. Co., 321 S. Main St., Ann Arbor, Mich.

SURFACE PLATES

See Plates, Surface

SWAGING MACHINES

Cincinnati Shaper Co., Elam and Garrard Aves., Cincinnati, Ohio.
Hartford Special Mchry. Co., 287 Homestead Ave., Hartford, Conn.
Lemert Engrg. Co., Inc., 210 E. Jefferson St., Plymouth, Ind.

SWITCHES

Allen-Bradley Co., 1326 S. 2nd St., Milwaukee, Wis.
General Electric Co., Schenectady, N. Y.
National Acme Co., 170 E. 131st St., Cleveland, Ohio.
Westinghouse Electric Corp., E. Pittsburgh, Pa.

TACHOMETERS

Scherr, George, Co., Inc., 200 Lafayette St., New York 12, N. Y.

TANGS, Replaceable, Drill & Reamer

Nu-Tangs Inc., 1335 Bates St., Cincinnati, Ohio.

TAPER PINS, Standard

Chicago Screw Co., Bellwood, Ill.
DoAll Co., 254 N. Laurel Ave., Des Plaines, Ill.
Lempco Products, Inc., 5490 Dunham Rd., Bedford, Ohio.
Pratt & Whitney, West Hartford 1, Conn.

TAP HOLDERS

Burg Tool Mfg. Co., 3743 Durango Ave., Los Angeles 34, Cal.
DoAll Co., 254 N. Laurel Ave., Des Plaines, Ill.
Errington Mechanical Laboratory, Inc., 24 Norwood Ave., Stapleton, S. I., N. Y.
McCrosky Tool Co., 1938 Thomas St., Meadville, Pa.
Scully-Jones & Co., 1903 Rockwell St., Chicago 8, Ill.

TAPPING ATTACHMENTS AND DEVICES

Avey Drilling Mach. Co., 26 E. Third St., Covington, Ky.
Baker Bros., Inc., Station F, P.O. Box 101, Toledo 10, Ohio.
Brown & Shorpe Mfg. Co., Providence, R. I.
Buhr Mch. Tool Co., 835 Green St., Ann Arbor, Mich.
DoAll Co., 254 N. Laurel Ave., Des Plaines, Ill.
Errington Mechanical Laboratory, Inc., 24 Norwood Ave., Stapleton, S. I., N. Y.
Etico Tool Co., Inc., 592 Johnson Ave., Brooklyn, N. Y.
Jarvis Corp., Middletown, Conn.
Leland-Gifford Co., 1425 Southbridge St., Worcester, Mass.
McCrosky Tool Corp., 1938 Thomas St., Meadville, Pa.
Morris Machine Tool Co., Inc., 946-M Harriet St., Cincinnati 3, Ohio.
Snow Mfg. Co., 435 Eastern Ave., Bellwood, Ill.
Thrifmaster Products Corp., 1076 N. Plum St., Lancaster, Pa.

TAPPING MACHINES

Avey Drilling Mach. Co., 26 E. Third St., Covington, Ky.
Baker Bros., Inc., Station F, P.O. Box 101, Toledo 10, Ohio.
Barnes Drill Co., 814 Chestnut, Rockford, Ill.
Barnes, W. F. & John, Co., 201 S. Water St., Rockford, Ill.
Baush Machine Tool Co., 156 Wasson Ave., Springfield 7, Mass.
Bodine Corp., 317 Mt. Grove St., Bridgeport, Conn.
Buffalo Forge Co., 490 Broadway, Buffalo, N. Y.
Buhr Mch. Tool Co., 835 Green St., Ann Arbor, Mich.
Challenge Mchry. Co., Grand Haven, Mich.
Cleveland Tapping Machine Co., 1201 Camden Ave., S. W., Canton 6, Ohio.
Cross Co., 3250 Bellevue Ave., Detroit 7, Mich.
Frew Machine Co., 121 East Luray St., Philadelphia 20, Pa.
Greenlee Bros. & Co., 12th and Columbia Aves., Rockford, Ill.
Hamilton Tool Co., 834 S. 9th St., Hamilton, Ohio.
Hartford Special Mchry. Co., 287 Homestead St., Hartford, Conn.
Hill Acme Co., 1201 W. 65th St., Cleveland 2, Ohio.
Kaufman Manufacturing Co., Manitowoc, Wis.
Kingsbury Mch. Tool Corp., Keene, N. H.
Leland-Gifford Co., 1025 Southbridge St., Worcester, Mass.
Millholland, W. K. Machinery Co., 6402 Westfield Blvd., Indianapolis 5, Ind.
Moline Tool Co., 102 20th St., Moline, Ill.
Morris Machine Tool Co., Inc., 946-M Harriet St., Cincinnati 3, Ohio.
National Acme Co., 170 E. 131st St., Cleveland, Ohio.
National Automatic Tool Co., Inc., S. 7th and N. Sts., Richmond, Ind.
Snow Mfg. Co., 435 Eastern Ave., Bellwood, Ill.
Werner & Swasey Co., 5701 Carnegie Ave., Cleveland 3, Ohio.

TAPPING MACHINES, Nut

Hill Acme Co., 1201 W. 65th St., Cleveland 2, Ohio.
National Machinery Co., Greenfield and Stanton Sts., Tiffin, Ohio.
Snow Mfg. Co., 435 Eastern Ave., Bellwood, Ill.

TAPS

Besley-Welles Corp., 112 Dearborn Ave., Beloit, Wis.
Butterfield Div., Union Twist Drill Co., Derby Line, Vt.
Card, S. W., Mfg. Co., Div. Union Twist Drill Co., Mansfield, Mass.
Continental Tool Works, Div. Ex-Cell-O Corp., Detroit 32, Mich.
Detroit Tap & Tool Co., 8615 E. 8 Mile Rd., Base Line, Mich.
DoAll Co., 254 N. Laurel Ave., Des Plaines, Ill.
Geometric Tool Co., Westville Station, New Haven 15, Conn.
Greenfield Tap & Die Corp., Greenfield, Mass.
Jarvis Corp., Middletown, Conn.
Landis Mch. Co. (Solid Adjustable), Waynesboro, Pa.
Morse Twist Drill & Mch. Co., New Bedford, Mass.
Pratt & Whitney, West Hartford 1, Conn.
Sheffield Corp., 721 Springfield St., Dayton 1, Ohio.
Threadwell Tap & Die Co., Greenfield, Mass.

TAPS, Collapsing

Geometric Tool Co., Westville Station, New Haven 15, Conn.
Landis Mch. Co., Waynesboro, Pa.
National Acme Co., 170 E. 131st St., Cleveland, Ohio.
Sheffield Corp., 721 Springfield St., Dayton 1, Ohio.

TESTING EQUIPMENT, Tension, Compression, Fatigue, etc.

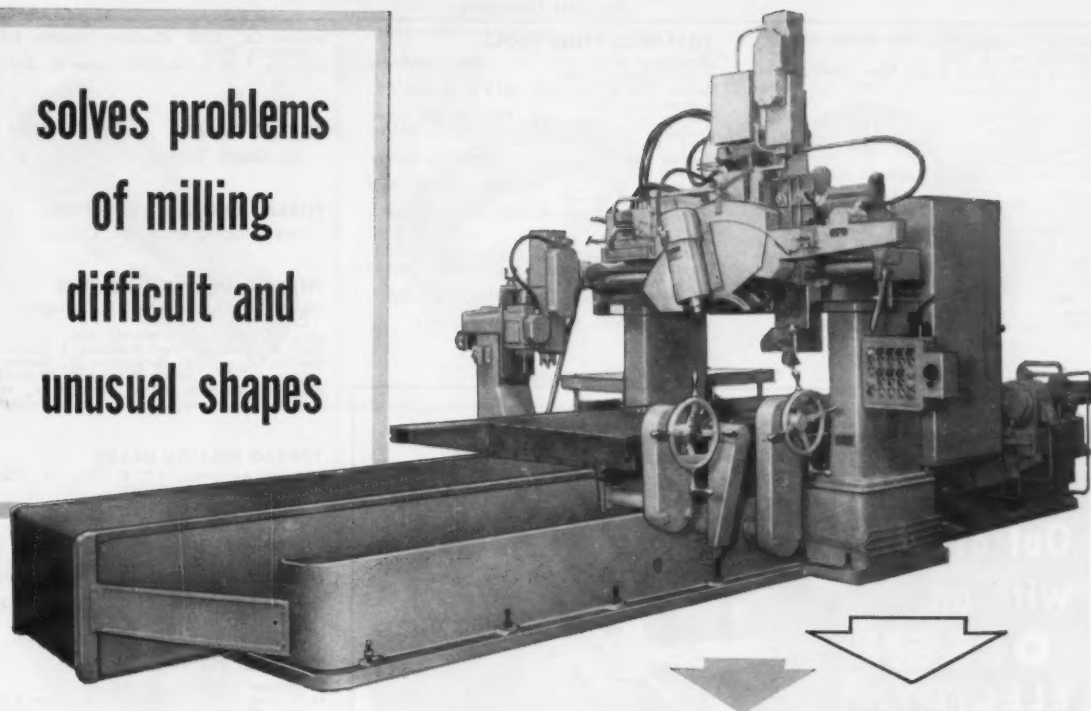
Olsen Tinius, Testing Mch. Co., Willow Grove, Pa.

THREAD CUTTING MACHINERY

Brown & Harpe Mfg. Co., Providence, R. I.
Cosa Corp., 405 Lexington Ave., New York 17, N. Y.
Coulter, James, Machine Co., Bridgeport 5, Conn.

(Continued on page 538)

solves problems
of milling
difficult and
unusual shapes



MOREY | **50-M "AEROFRAME"** **PROFILE MILLING MACHINE**

The MOREY "Aeroframe" Profile Milling Machine does yesterday's "impossible" jobs *today*. It was designed especially for fast and economical production of parts with variable angles (swarth cuts) and eliminates the need for the many costly swivel fixtures previously required.

This remarkable machine provides for controlled 360° contour milling plus the vertical dimension, *plus the 4th and 5th dimensions*, swiveling up to 15°.

More than 175 MOREY heavy duty 50M machines are in successful operation—thousands more in the smaller sizes. They are ideal for milling aluminum and chrome nickel steel aircraft parts as well as large auto part dies. This is what the production chief of one large East coast aircraft plant says of his battery of MOREY profilers: "We have been able to increase our production at least three to one over the conventional milling machine practice on the same part!"

Morey profilers may be equipped with electric remote control tracing, pencil type and automatic hydraulic copying... Also hand feeds.

STANDARD MACHINES

36" x 4', 6', 10', 12' and 14'.
48" x 10', 12'.
60" x 14', 20'.
72" x 20'.

SPECIALS: Any variation of the standard machine available to order, with increased heights, widths and table lengths to suit the job.

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 Eastern Mch. Screw Corp., New Haven, Conn.
 Fellows Gear Shaper Co., 78 River St., Springfield, Vt.
 Grant Mfg. & Mch. Co., 90 Silliman St., Bridgeport 5, Conn.
 Hanson-Whitney Co., Div. Whitney Chain Co., Hartford, Conn.
 Hill Acme Co., 1201 W. 65th St., Cleveland 2, Ohio.
 Kaufman Manufacturing Co., Manitowoc, Wis.
 Landis Mch. Co., Waynesboro, Pa.
 Lees-Bradner Co., Cleveland, Ohio.
 Pratt & Whitney, West Hartford 1, Conn.
 Rivett Lathe & Grinder, Inc., Brighton, Boston 35, Mass.
 Scherr, George, Co., Inc., 200 Lafayette St., New York 12, N. Y.
 Snow Mfg. Co., 435 Eastern Ave., Bellwood, Ill.
 Taft-Peirce Mfg. Co., Woonsocket, R. I.

THREAD CUTTING TOOLS

Armstrong Bros. Tool Co., 5200 Armstrong Ave., Chicago, Ill.
 Detroit Top & Tool Co., 8615 E. 8 Mile Rd., Base Line, Mich.
 Eastern Mch. crew Corp., New Haven, Conn.
 Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit 32, Mich.
 Fellows Gear Shaper Co., 78 River St., Springfield, Vt.
 Geometric Tool Co., Westville Station, New Haven 15, Conn.
 Hill Acme Co., 1201 W. 65th St., Cleveland 2, Ohio.
 Landis Mch. Co., Waynesboro, Pa.
 Pratt & Whitney, West Hartford 1, Conn.
 Rivett Lathe & Grinder, Inc., Brighton, Boston 35, Mass.
 Sheffield Corp., 721 Springfield St., Dayton 1, Ohio.
 Taft-Peirce Mfg. Co., Woonsocket, R. I.

Wesson Co., 1220 Woodward Heights Blvd., Ferndale, Mich.
 Williams, J. H. & Co., 400 Vulcan St., Buffalo 7, N. Y.

THREAD GAGES

See Gages, Thread.

THREAD GRINDING MACHINES

See Grinding Machines, Thread

THREAD MILLING MACHINES

Coulter, James, Machine Co., Bridgeport 5, Conn.
 Lees-Bradner Co., Cleveland, Ohio.
 Pratt & Whitney, West Hartford 1, Conn.
 Sheffield Corp., 721 Springfield St., Dayton 1, Ohio.
 Waltham Machine Works, Newton St., Waltham, Mass.

THREAD ROLLING HEADS

National Acme Co., 170 E. 131st St., Cleveland, Ohio.

THREAD ROLLING MACHINES

Landis Machine Co., Waynesboro, Pa.
 Hartford Special Mchry. Co., 287 Homestead St., Hartford, Conn.
 Read Rolled Thread Die Co., P.O. Box 350, Worcester 1, Mass.

TIN AND TERNEPLATES

Bethlehem Steel Co., Bethlehem, Pa.
 U. S. Steel Corp., (Carnegie-Illinois Steel Corp., Div., Columbia Steel Co., Div., Tennessee Coal, Iron & R. R. Co., Div.), 436 7th Ave., Pittsburgh, Pa.

TOOL BITS, High Speed Steel

Allegheny Ludlum Steel Corp., Pittsburgh, Pa.
 Armstrong Bros. Tool Co., 5200 W. Armstrong Ave., Chicago, Ill.
 Besley-Welles Corp., 20 N. Wacker Drive, Chicago 6, Ill.
 Carpenter Steel Co., Reading, Pa.
 Cleveland Twist Drill Co., 1242 E. 49th St., Cleveland, Ohio.
 Crucible Steel Co. of America, Oliver Bldg., Pittsburgh 30, Pa.
 DoAll Co., 254 N. Laurel Ave., Des Plaines, Ill.
 du Mont Corp., Greenfield, Mass.
 Firth Sterling Inc., 3113 Forbes St., Pittsburgh 30, Pa.
 Ryerson, Jos. T., & Son, Inc., 2558 W. 16th St., Chicago 18, Ill.
 Simonds Saw & Steel Co., 470 Main St., Fitchburg, Mass.
 Wesson Co., 1220 Woodward Heights Blvd., Ferndale, Mich.
 Vanadium Alloys Steel Co., Latrobe, Pa.
 Wheelock-Lovejoy & Co., Inc., Cambridge, Mass.
 Williams, J. H. & Co., 400 Vulcan St., Buffalo 7, N. Y.

TOOL BITS, Special Alloy

Allegheny Ludlum Steel Corp., Pittsburgh, Pa.
 Cleveland Twist Drill Co., 1242 E. 49th St., Cleveland, Ohio.
 DoAll Co., 254 N. Laurel Ave., Des Plaines, Ill.
 Firth Sterling Inc., 3113 Forbes St., Pittsburgh 30, Pa.
 Haynes Stellite Div., Union Carbide & Carbon Corp., 30 E. 42nd St., New York, N. Y.
 Kennametal, Inc., Latrobe, Pa.
 Vanadium Alloys Steel Co., Latrobe, Pa.
 Wesson Co., 1220 Woodward Heights Blvd., Ferndale, Mich.

TOOL GRINDERS

See Grinding Machines for Sharpening, Turning and Planing Tools

TOOL HOLDERS

Apex Tool & Cutter Co., Inc., 237 Canal St., Shelton, Conn.
 Armstrong Bros. Tool Co., 5200 W. Armstrong Ave., Chicago, Ill.
 Burg Tool Mfg. Co., 3743 Durango Ave., Los Angeles 34, Cal.
 Davis Boring Tool Div., Giddings & Lewis Machine Tool Co., Fond du Lac, Wis.
 Eclipse Counterbore Co., 1600 Bonner Ave., Ferndale, Mich.

(Continued on page 540)

Take the "GUESSWORK"

Out of BALANCING

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OLSEN

ELECODYNE

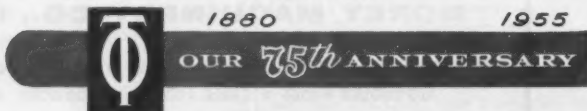
BALANCING

MACHINE



- Automatic Indication of Angle and amount of unbalance with the Elecodyne system—an Olsen exclusive.
- Simplified Operation. Operator merely inserts the part and starts the machine. In a matter of seconds he knows the amount and angle of unbalance in the planes of correction.
- Positive Plane Separation. Exclusive Tinius Olsen pivoted cradle design assures complete, positive plane separation. The Elecodyne only indicates the unbalance in the selected plane of correction. Rapid acting plane of correction selector speeds balancing operation.
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- Production Line Balancing is a reality with an Olsen Elecodyne—your best investment for rapid, accurate and low cost balancing.

Bulletin 49 contains details on the complete line of Olsen static, dynamic and automatic Elecodyne balancing machines. Write for your copy.



TINIUS OLSEN TESTING MACHINE CO.
 2080 Easton Road • Willow Grove, Pa.
 Testing & Balancing Machines



How to cut machining time on hard, tough parts like these

ASTEEL can be hard and tough without needing to be hard and tough *to machine*. If you need such a steel for slitter knives, machine tool parts, pump parts, or other parts where wear resistance and strength are important, get Timken 52100 steel.

Its fully spheroidizing structure makes 52100 easy to machine. And without sacrificing strength or hardenability!

This high-carbon analysis alloy steel has high fatigue and tensile strength as well as good hardenability throughout its cross section. Timken 52100 steel will withstand working pressures up to 200,000 p.s.i., and can be oil quenched to a maximum

hardness of 65/66 Rockwell C. in normal sections.

Rigid quality control at every step in production is your assurance of uniform quality in every shipment. The Timken Company pioneered the production of 52100. We are one of the world's largest producers of 52100 and the *only* source of 52100 steel in three finished forms—bars, tubes and wires. And for small run or emergency requirements, the Timken Company maintains a mill stock of 101 sizes of 52100 tubing, ranging from 1" to 10½" O.D.

For a stock list of available sizes, grades and finishes, write The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable: "TIMROSCO".

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SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS TUBING

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MACHINERY, September, 1955—539

Gairing Tool Co., 21225 Hoover Rd., Detroit 32, Mich.
 Michigan Tool Co., 7171 E. McNichols Rd., Detroit, Mich.
 Portage Double Quick Tool Co., 1063 Sweitzer Ave., Akron 11, Ohio.
 R and L Tools, 1825 Bristol St., Philadelphia 40, Pa.
 Scully-Jones & Co., 1903 Rockwell St., Chicago 8, Ill. (Turret)
 South Bend Lathe Works, Inc., 425 E. Madison St., South Bend, Ind.
 Warner & Swasey Co., 5701 Carnegie Ave., Cleveland 3, Ohio.
 Wesson Co., 1220 Woodward Heights Blvd., Ferndale, Mich.
 Williams, J. H. & Co., 400 Vulcan St., Buffalo 7, N. Y.
 Ziegler, W. M., Tool Co., Detroit, Mich.

TOOLMAKERS' INSTRUMENTS

Ames, B. C., Co., Waltham 54, Mass.
 Brown & Sharpe Mfg. Co., Providence, R. I.

Scherr, George, Co., Inc., 200 Lafayette St., New York 12, N. Y.
 Storrett, The L. S., Co., Athol, Mass.
 Taft-Peirce Mfg. Co., Woonsocket, R. I.

TOOL RESINS

Marlette Corp., 37-33 Thirtieth St., Long Island City 1, N. Y.

TOOL STEEL

Allegheny Ludlum Steel Corp., Pittsburgh, Pa.
 Bethlehem Steel Co., Bethlehem, Pa.
 Carpenter Steel Co., Reading, Pa.
 Crucible Steel Co. of America, Oliver Bldg., Pittsburgh 30, Pa.

Firth Sterling Inc., 3113 Forbes St., Pittsburgh 30, Pa.
 Ryerson, Jos. T., & Son, Inc., 2558 W. 16th St., Chicago 18, Ill.
 Vanadium Alloys Steel Co., Latrobe, Pa.

TOOLS, Carbide-Tipped

Allegheny Ludlum Steel Corp., Pittsburgh, Pa.
 The Atrax Co., (Carbide) 240 Day St., Newington 11, Conn.
 Carboly Dept., General Electric Co., Box 237, Roosevelt Park Annex, Detroit 32, Mich.
 Chicago-Latrobe Twist Drill Works, 411 W. Ontario St., Chicago, Ill.
 Cleveland Twist Drill Co., 1242 E. 49th St., Cleveland, Ohio.
 Colonial Broach Co., Detroit 13, Mich.
 DoAll Co., 234 N. Laurel Ave., Des Plaines, Ill.
 Eclipse Counterbore Co., 1600 Bonner Ave., Ferndale, Mich.
 Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit 32, Mich.
 Firth Sterling Inc., 3113 Forbes St., Pittsburgh 30, Pa.
 Gairing Tool Co., 21225 Hoover Rd., Detroit 32, Mich.
 Kennametal, Inc., Latrobe, Pa.
 McCroskey Tool Corp., 1938 Thomas St., Meadville, Pa.
 Metal Carbides Corp., Youngstown, Ohio.
 Newcomer Products, Latrobe, Pa.
 Super Tool Co., 21650 Hoover Rd., Detroit 13, Mich.
 Union Twist Drill Co., Athol, Mass.
 Wesson Co., 1220 Woodward Heights Blvd., Ferndale, Mich.
 Whitman & Barnes, 40600 Plymouth Rd., Plymouth, Mich.
 Willey's Carbide Tool Co., 1340 W. Vernor Hwy., Detroit 1, Mich.

TOOLS, Lathe, Shaper and Planer

Allegheny Ludlum Steel Corp., Pittsburgh, Pa.
 Apex Tool & Cutter Co., Inc., 237 Canal St., Shelton, Conn.
 Armstrong Bros. Tool Co., 5200 W. Armstrong Ave., Chicago, Ill.
 Bullard Co., Brewster St., Bridgeport 2, Conn.
 Carboly Dept., General Electric Co., Box 237, Roosevelt Park Annex, Detroit 32, Mich.
 du Mont Corp., Greenfield Mass.
 Firth Sterling Inc., 3113 Forbes St., Pittsburgh 30, Pa.
 Gairing Tool Co., 21225 Hoover Rd., Detroit 32, Mich.
 Haynes Stellite Div., Union Carbide & Carbon Corp., 30 E. 42nd St., New York, N. Y.
 Kennametal, Inc., Latrobe, Pa.
 South Bend Lathe Works, Inc., 425 E. Madison St., South Bend, Ind.
 Super Tool Co., 21650 Hoover Road, Detroit 13, Mich.
 Turchan Follower Machine Co., 8259 Livernois & Alaska Aves., Detroit, Mich.
 Warner & Swasey Co., 5701 Carnegie Ave., Cleveland, Ohio.
 Wesson Co., 1220 Woodward Heights Blvd., Ferndale, Mich.
 Williams, J. H. & Co., 400 Vulcan St., Buffalo 7, N. Y.

TRANSFER MACHINES, Automatic

Baird Machine Co., 1700 Stratford Ave., Stratford, Conn.
 Barnes Drill Co., 814 Chestnut St., Rockford, Ill.
 Barnes, W. F. & John, Co., 201 S. Water St., Rockford, Ill.
 Buhr Mch. Tool Co., 835 Green St., Ann Arbor, Mich.
 Colonial Broach Co., P.O. Box 37, Harper Sta., Detroit 13, Mich.
 Cross Co., 3250 Bellevue Ave., Detroit 7, Mich.
 Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit 32, Mich.
 Sundstrand Mch. Tool Co., 2531 11th St., Rockford, Ill.

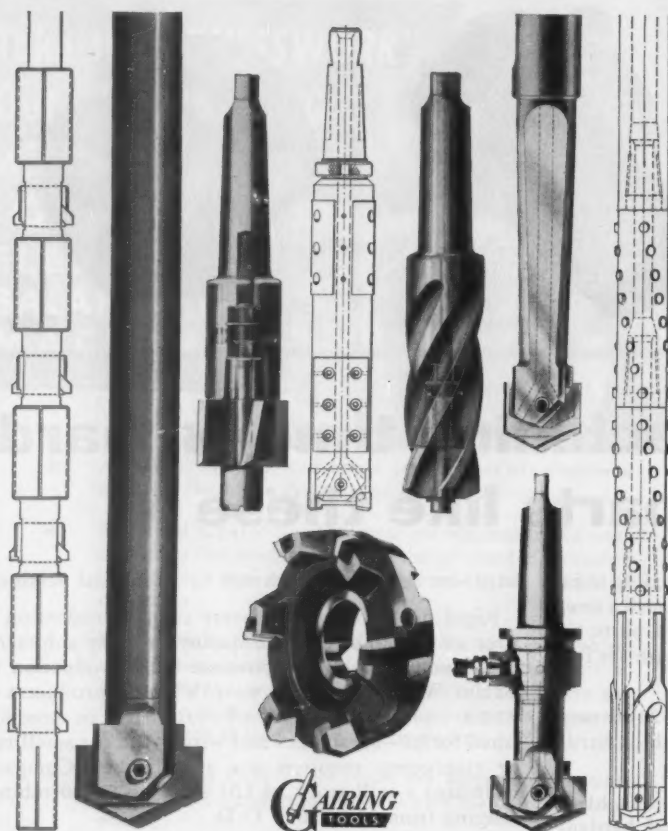
TRANSFORMERS

General Electric Co., Schenectady, N. Y.

TRANSMISSION, Variable Speed

Oilgear Co., 1569 W. Pierce St., Milwaukee, Wis.
 Reliance Electric & Engrg. Co., 1047 Ivanhoe Rd., Cleveland 10, Ohio.
 Sundstrand Mch. Tool Co., 2531 11th St., Rockford, Ill.

(Continued on page 542)



Try them for yourself . . .

- You'll be amazed at the rigid cutting power of the quick-change *Block-Type Boring Tools* . . . no cross holes or centering pins . . . an exclusive GAIRING feature.
- You'll discover the economy of drilling all large holes with *GAIRING Spade Drills*. The holders shown use standard cutters to drill and bore shallow holes as well as holes of great depth.
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Faxfilm, 23X, shows characteristic phosphate coating obtained on steel by using conventional alkali cleaner followed by phosphating material without ICRA. Note size of crystals.



Faxfilm, 23X, shows characteristic phosphate coating obtained on steel by using same alkali cleaner and Bonderite with ICRA. Note extremely fine crystals.

New Bonderite 800 series contains I C R A

(INTERNAL CRYSTAL REFINING AGENT)

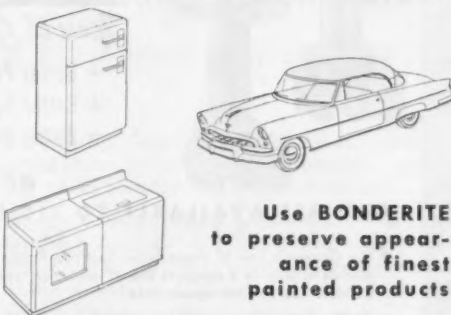
Built-in improved performance!

In the new Bonderite 800 Series, Parker presents a great new development in zinc phosphate coating. ICRA—Internal Crystal Refining Agent—produces a denser coating with finer crystalline structure. Use it on steel surfaces, and on zinc surfaces such as galvanized, zinc base die castings, and electrogalvanized in mixed production with steel.

The very smooth, continuous phosphate surface produced by 800 Series Bonderites makes for exceptional evenness of paint penetration, with greater uniformity of paint luster. Metal coated with 800 Series Bonderites may be rubbed, bent or flexed without loss of coating bond. This means better adhesion of paint, also.

Many types of Bonderite with ICRA are available in the 800 Series. You can choose the one best suited to your needs as to method of application, processing time and temperature, and coating weight.

Get full information on Bonderite 800 Series with ICRA. Call or write today.



Use BONDERITE to preserve appearance of finest painted products

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corrosion resistant
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aids in cold forming
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PARCO COMPOUND
rust resistant

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TROPICAL
heavy duty maintenance
paints since 1883

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MACHINERY, September, 1955—541

T-V

Product Directory

TUBE FLANGING MACHINES

Grant Mfg. & Mch. Co., 90 Sillman St., Bridgeport 5, Conn.

TUBE FORMING AND WELDING MACHINES

Federal Machine & Welder Co., Overland Ave., Warren, Ohio.
Yoder Co., 550 Walworth Ave., Cleveland, Ohio.

TUBE MILLS

Abbey-Etna Co., 2444 Maplewood Ave., Toledo 10, Ohio.
American Electric Fusion Corp., 2622 Diversey Ave., Chicago, Ill.
Yoder Co., 550 Walworth Ave., Cleveland, Ohio.

TUBING, Brass and Copper

American Brass Co., 25 Broadway, New York, N. Y.
Mueller Brass Co., Port Huron 35, Mich.
Revere Copper & Brass Inc., 230 Park Ave., New York, N. Y.

TUBING, Flexible

American Metal Hose Br. American Brass Co., 25 Broadway, New York, N. Y.

TUBING, Steel

Allegheny Ludlum Steel Corp., Pittsburgh, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Carpenter Steel Co., Reading, Pa.
National Tube Div. U. S. Steel Corp., 525 Wm. Penn Place, Pittsburgh, Pa.
Ryerson, Jos. T. & Son, Inc., 2558 W. 16th St., Chicago 18, Ill.
Timken Roller Bearing Co., Canton, Ohio.

TWIST DRILLS

See Drills, Twist

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L. J. Wing Mfg. Co., Linden, N. J.

UNIVERSAL JOINTS

Baush Machine Tool Co., 156 Wassen Ave., Springfield 7, Mass.
Boston Gear Works, 3200 Main St., North Quincy 71, Mass.
Gear Grinding Machine Co., 3901 Christopher St., Detroit 11, Mich.

VALVE CONTROLS

Lehigh Foundries, Inc., 1500 Lehigh Dr., Easton, Pa.
Philadelphia Gear Works (Motorized), Erie Ave. and G St., Philadelphia, Pa.

VALVES, Air

Hannifin Corp., 501 S. Wolf Rd., Des Plaines, Ill.
Hunt, C. B. & Son, Inc., 1911 E. Pershing St., Salem, Ohio.
Lehigh Foundries, Inc., 1500 Leigh Dr., Easton, Pa.
Rivett Lathe & Grinder Inc., Brighton, Boston 35, Mass.
Ross Operating Valve Co., 120 E. Golden Gate, Detroit, Mich.

VALVES, Hydraulic

American Steel Foundries, Elmes Engrg. Div., Paddock Rd. and Tennessee Ave., Cincinnati, Ohio.
Baldwin-Lima-Hamilton Corp., Eddystone Div., Philadelphia 42, Pa.
Barnes, John S., Corp., Rockford, Ill.
Denison Engrg. Co., 1160 Dublin St., Columbus 16, Ohio.
Hannifin Corp., 501 S. Wolf Rd., Des Plaines, Ill.
Hunt, C. B. & Son, Inc., 1911 E. Pershing St., Salem, Ohio.
Hydraulic Press Mfg. Co., 300 Lincoln Ave., Mt. Gilead, Ohio.
Hydropress, Inc., 350 Fifth Ave., New York 1, N. Y.
Lehigh Foundries, Inc., 1400 Lehigh Dr., Easton, Pa.
Logansport Machine Co., Inc., 810 Center Ave., Logansport, Ind.
Oliger Co., 1569 W. Pierce St., Milwaukee, Wis.
Rivett Lathe & Grinder, Inc., Brighton, Boston 35, Mass.
Sundstrand Mch. Tool Co., 2531 11th St., Rockford, Ill.
Turchan Follower Machine Co., 8259 Livernois & Alaska Aves., Detroit, Mich.
Vickers, Inc., 1402 Oakman Blvd., Detroit, Mich.

VIBRATION INSULATION

American Felt Co., Glenville, Conn.

VICES, Machine

Armstrong-Blum Mfg. Co., 5700 W. Bloomingdale Ave., Chicago, Ill.
Armstrong Bros. Tool Co., 5200 W. Armstrong Ave., Chicago, Ill.
Brown & Sharpe Mfg. Co., Providence, R. I.
Chicago Tool & Engineering Co., 839 So. Chicago Ave., Chicago, Ill.
Cincinnati Milling Mch. Co., Oakley, Cincinnati 9, Ohio.
Hannifin Corp., 501 S. Wolf Rd., Des Plaines, Ill.
Logansport Machine Co., Inc., 810 Center Ave., Logansport, Ind.
Producto Mch. Co., 990 Housatonic Ave., Bridgeport, Conn.
Skinner Chuck Co., 344 Church St., New Britain, Conn.
South Bend Lathe Works, Inc., 425 E. Madison St., South Bend, Ind.
Universal Engineering Co., Frankenmuth 2, Mich.
U. S. Burke Machine Tool Div., Brotherton Rd. 17, Cincinnati 27, Ohio.

(Continued on page 544)

New



H-6000 Series—
1/4 HP 11 GPM,
15' Head

New



H-7000 Series—
1/4 HP 22 GPM,
15' Head

New



Series Thirty—
1/4 HP 20 GPM,
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1/2 HP 36 GPM,
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1/2 HP 65 GPM,
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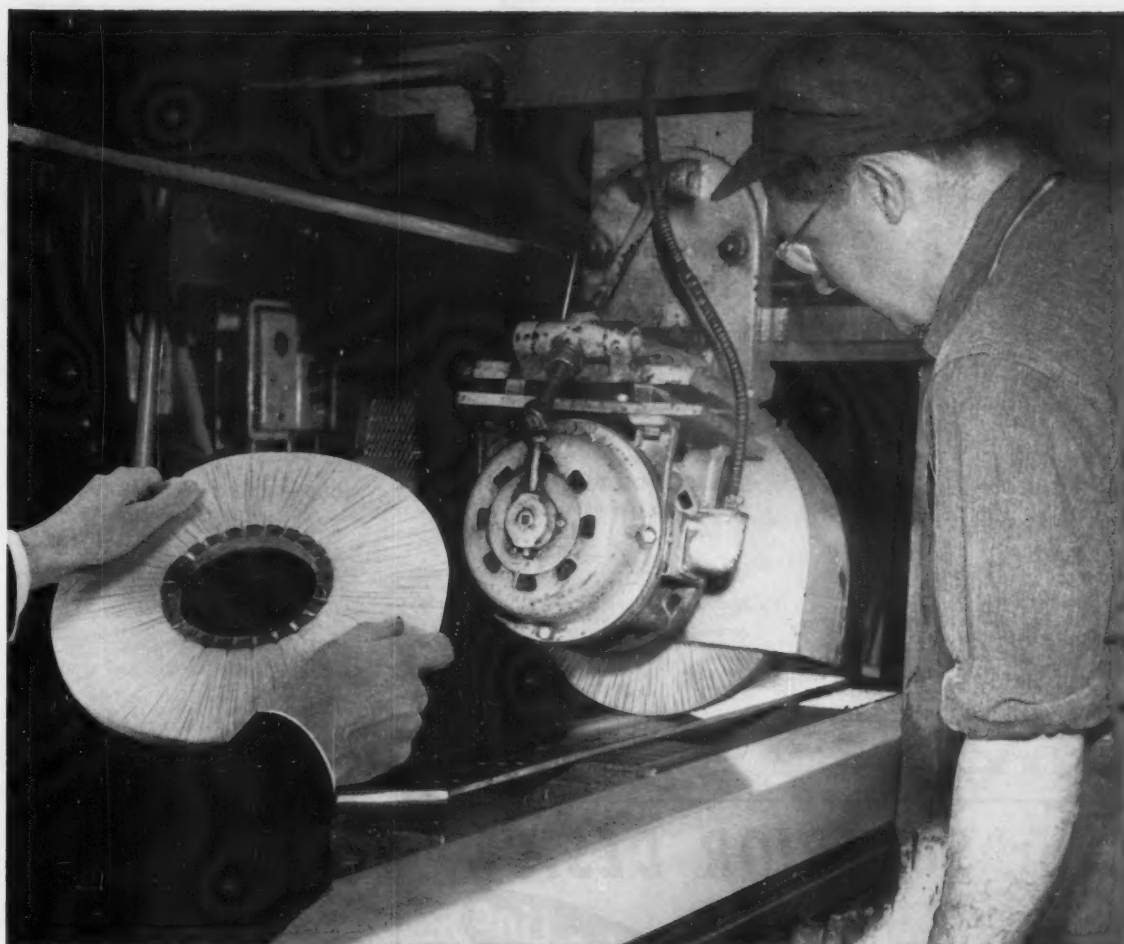
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for Machine
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Power brushing idea by OBA to improve your product

Here's a cost-saving idea if your products require smooth finish.

The knife blade shown is the kind used to cut paper and wood veneer.

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V-Z

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Armstrong Bros. Tool Co., 5200 W. Armstrong Ave., Chicago, Ill.
Williams, J. H. & Co., 400 Vulcan St., Buffalo 7, N. Y.

VICES, Planer and Shaper

Brown & Sharpe Mfg. Co., Providence, R. I.
Cincinnati Shaper Co., Elan and Garrard Aves., Cincinnati, Ohio.
Rockford Mch. Tool Co., 2500 Kishwaukee St., Rockford, Ill.
Skinner Chuck Co., 344 Church St., New Britain, Conn.
South Bend Lathe Works, Inc., 425 E. Madison St., South Bend, Ind.

VOLTMETERS

General Electric Co., Schenectady, N. Y.

WASHERS, Lock

Eaton Mfg. Co., Reliance Div., 25 Charles Ave., S. E. Massillon, Ohio.

WASHERS, Spring

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Linde Air Products Co., Div. Union Carbide & Carbon Corp., 30 E. 42nd St., New York, N. Y.

WELDING AND CUTTING GAGES

Linde Air Products Co., Div. Union Carbide & Carbon Corp., 30 E. 42nd St., New York, N. Y.

WELDING EQUIPMENT, Electric Arc

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Federal Mch. & Welder Co., Warren, Ohio.
General Electric Co., Schenectady, N. Y.
Lincoln Electric Co., 22801 St. Clair Ave., Cleveland, Ohio.
Westinghouse Electric Corp., E. Pittsburgh, Pa.

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Federal Mch. & Welder Co., Warren, Ohio.

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duMont Corp., Greenfield, Mass.

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Baldwin-Lima-Hamilton Corp., Lima Hamilton Div., Hamilton, Ohio.
Federal Machine & Welder Co., Overland Ave., Warren, Ohio.
Mahon, R. C., Co., Detroit 34, Mich.
Version Airsteel Press Co., 93rd St. & S. Kenwood Ave., Chicago, Ill.

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WIRE

American Steel & Wire Co., Div. U. S. Steel Corp., Rockefeller Bldg., Cleveland, Ohio.
Bethlehem Steel Co., Bethlehem, Pa.
U. S. Steel Corp., (American Steel & Wire Co. Div., Columbia Steel Co., Div., Tennessee Coal, Iron & R. R. Co. Div.), 436 7th Ave., Pittsburgh, Pa.

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Baird Machine Co., 1700 Stratford Ave., Stratford, Conn.
U. S. Tool Co., Inc., 255 North 18th St., Amherst, N. J.

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Baird Machine Co., 1700 Stratford Ave., Stratford, Conn.
Bliss, E. W., Co., 1375 Raff Rd., S. W., Canton, Ohio.
National Mchry. Co., Greenfield and Stanton Sts., Tiffin, Ohio.
Ryerson, Jos. T. & Son, Inc., 2558 W. 16th St., Chicago 18, Ill.

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Greenlee Bros. & Co., 12th and Columbia Aves., Rockford, Ill.
Onsrud Machine Works, Inc., 3940 Palmer St., Chicago, Ill.

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Cleveland Worm & Gear Co., 3249 E. 80th St., Cleveland, Ohio.
Cone-Drive Gear Div., Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich.
Philadelphia Gear Works, Erie Ave. and G. St., Philadelphia, Pa.

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Armstrong Bros. Tool Co., 5200 W. Armstrong Ave., Chicago, Ill.
Ingersoll-Rand Co. (Impact, Pneumatic, Electric), Phillipsburg, N. J.
Williams, J. H. & Co., 400 Vulcan St., Buffalo 7, N. Y.

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Armstrong Bros. Tool Co., 5200 W. Armstrong Ave., Chicago, Ill.
Williams, J. H. & Co., 400 Vulcan St., Buffalo 7, N. Y.

WRENCHES, Pipe

Armstrong Bros. Tool Co., 5200 W. Armstrong Ave., Chicago, Ill.

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WRENCHES, Tap

Butterfield Div., Union Twist Drill Co., Derby Line, Vt.
Card, S. W., Mfg. Co., Div. Union Twist Drill Co., Mansfield, Mass.
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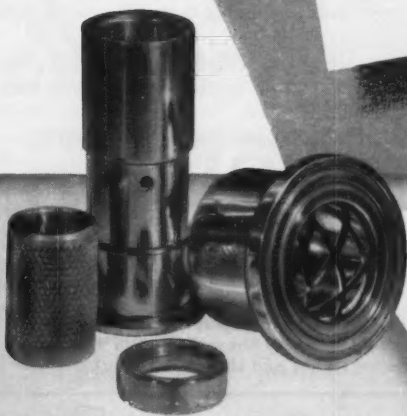
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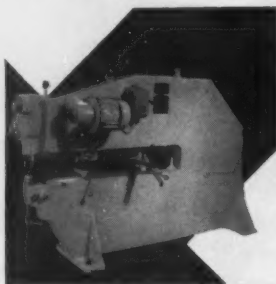


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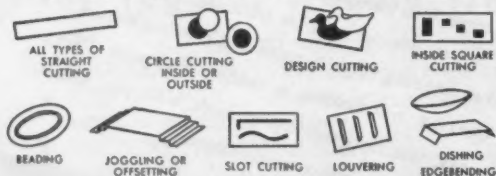
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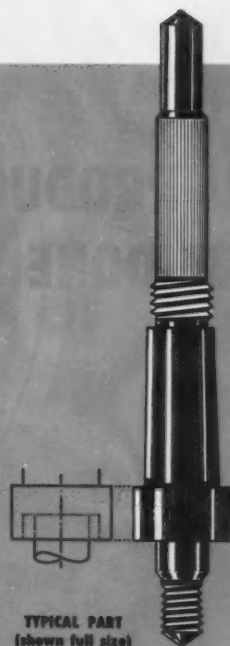
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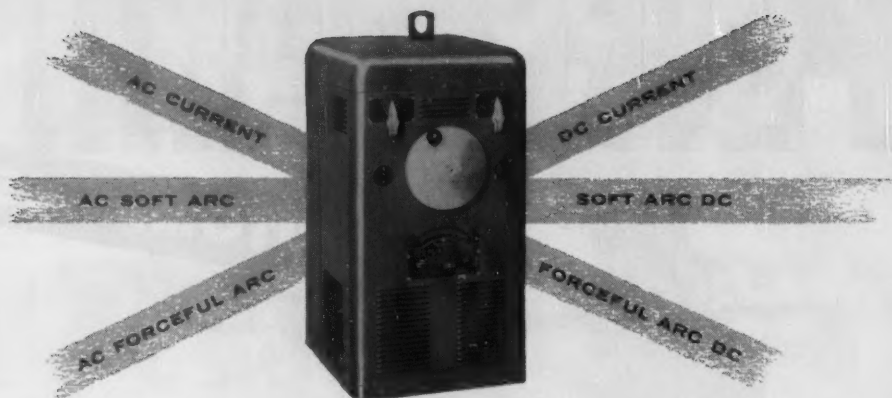


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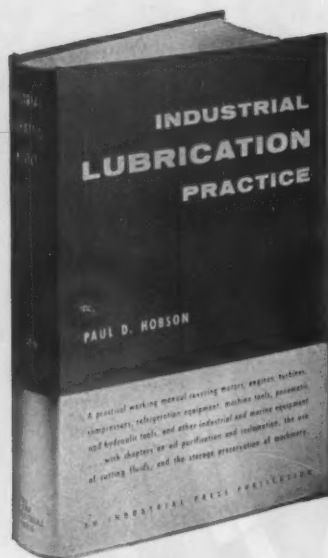
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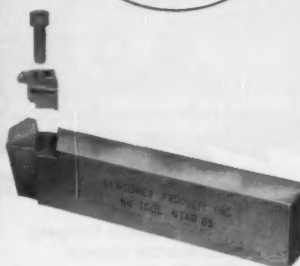
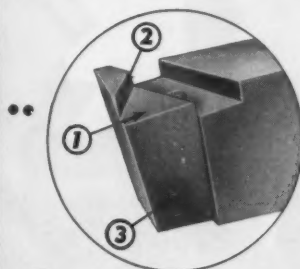
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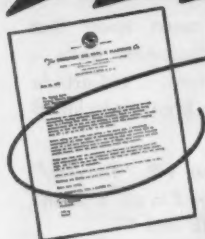
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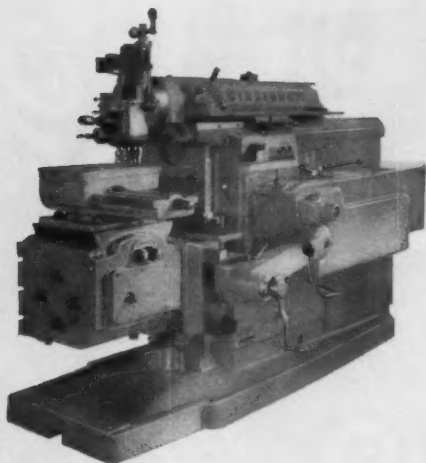
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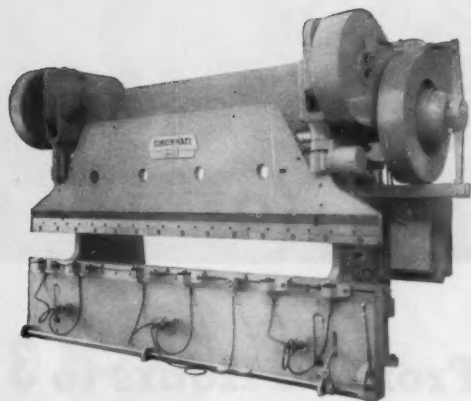


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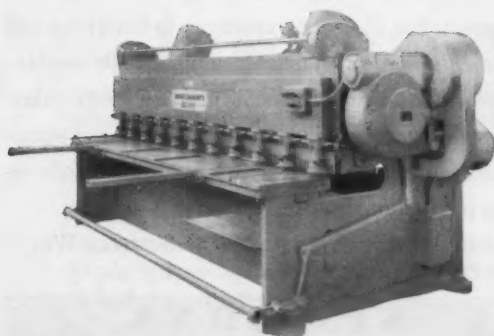
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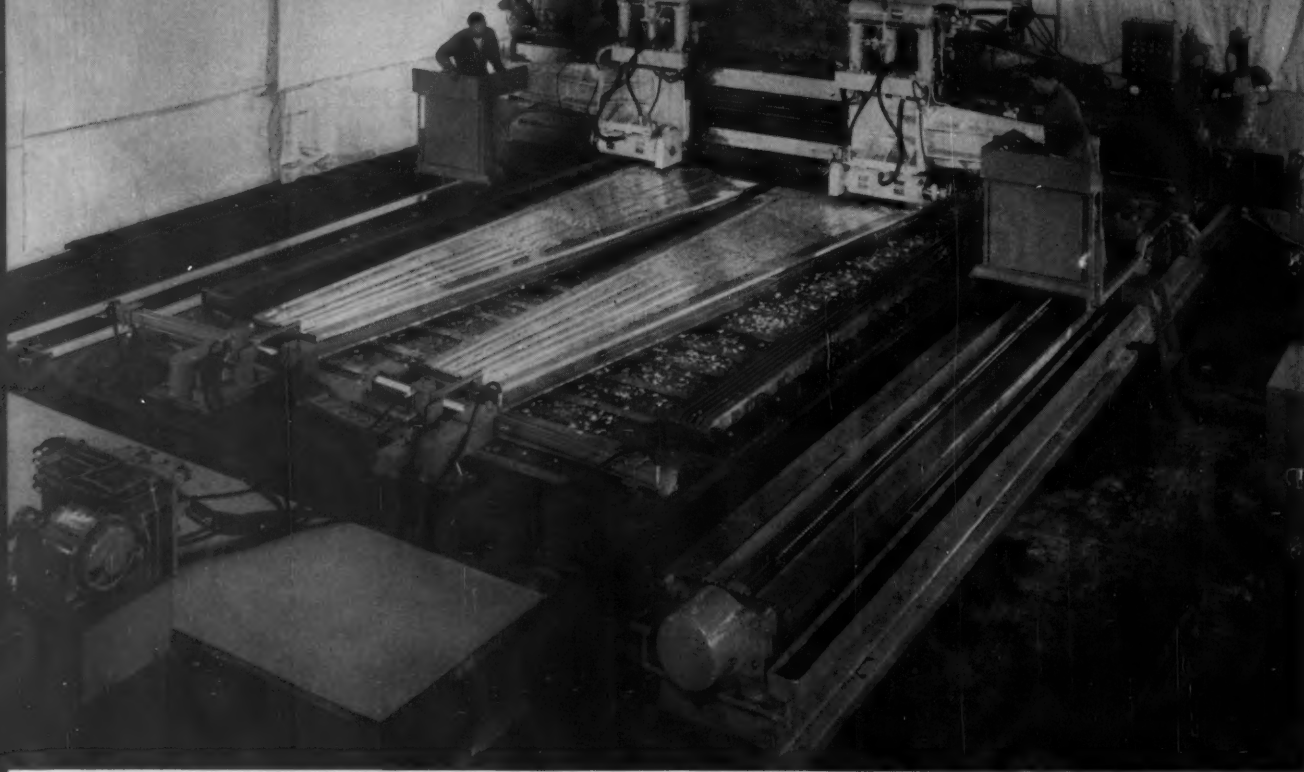
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This 225-ton, completely automatic skin mill sculpts integrally-stiffened wing sections for the Super Sabre Jet out of aluminum alloy slabs.

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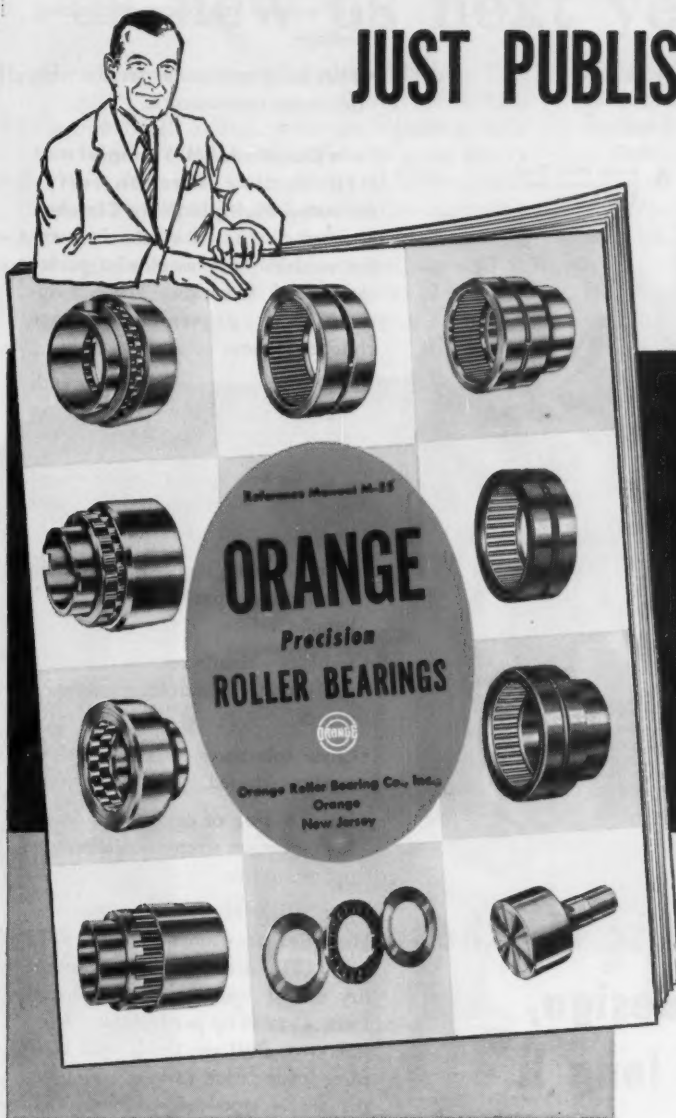
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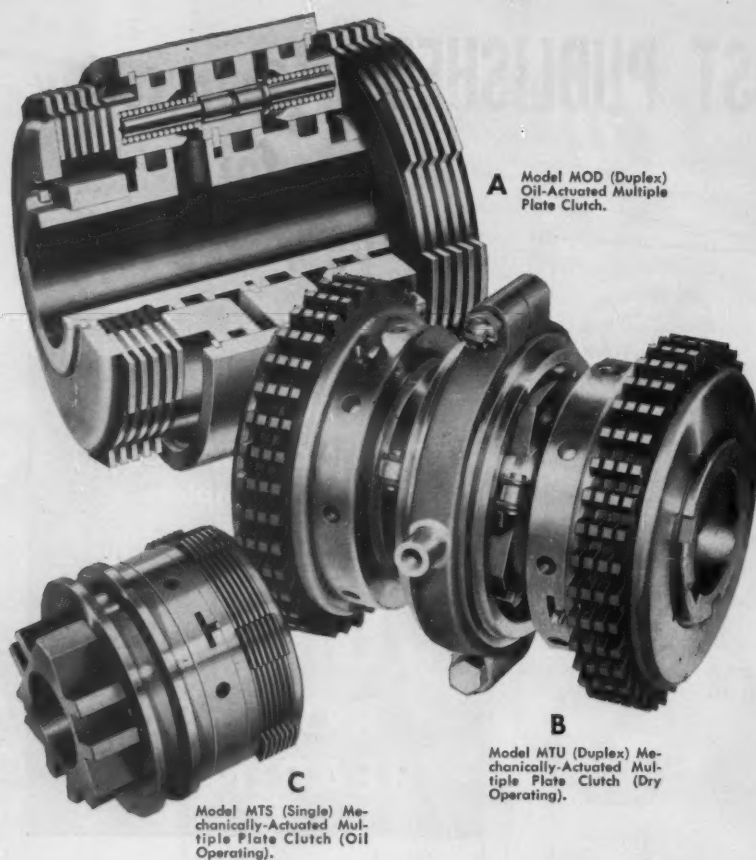
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A Model MOD (Duplex) Oil-Actuated Multiple Plate Clutch.

B

Model MTU (Duplex) Mechanically-Actuated Multiple Plate Clutch (Dry Operating).

C

Model MTS (Single) Mechanically-Actuated Multiple Plate Clutch (Oil Operating).

Multiple Plate Twin Disc Clutches provide simple design, quick adjustment, long life

Twin Disc Model MOS (single) and MOD (duplex) Oil-Actuated Multiple Plate Clutches—offer machine tool designers *plus* advantages never before available. They are Twin Disc's answer to the demand for high energy, high inertia, high horsepower clutches especially adaptable to applications creating high temperatures and operating under heavy, abusive loads.

Models MOS and MOD clutches give *new* performance on the job *because*:

- New, integral oil cylinder clamps plate stack, compensates automatically for friction plate wear.

- Mechanical controls to take up or adjust for wear are eliminated. Wear life is longer!
- A *floating* pressure plate is the ram of the cylinder. As plate stacks wear, ram travel increases automatically.
- Torque capacity of clutch is always constant for a given oil pressure. There's no loss of torque through plate wear or varying adjustment.
- Constant torque capacity often permits more compact installation of a *smaller* clutch . . . saves space and cost.
- They're adaptable to remote con-

trol without complicated actuating linkage.

- They offer *continuous* service with minimum maintenance.

Twin Disc Model MTS (single) and MTU (duplex) Mechanically-Actuated Multiple Plate Clutches—are the standard of the industry for machine tool users who prefer mechanical actuation. These long-established, proven-performance clutches *feature*:

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- Compact design—to operate in minimum of space. (Shorter clutch lengths).
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- Close tolerances—all parts accurately machined.
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Twin Disc Mechanically-Actuated Multiple Plate Clutches, Models MTS and MTU, are available for either dry or oil operation, in capacities from .47 to 44 hp per 100 rpm. Write today for Bulletin 134-B, and complete information to help you select the *proper* type and size Twin Disc Multiple Plate Clutch for your application. Twin Disc Clutch Company, Racine, Wisconsin, Hydraulic Division, Rockford, Illinois.

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Sept. 6 to 16



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- Our new horizontal boring mill, table type, with 4" and 4½" spindles and pushbutton controls ▶
- A new power rotary table, with 50" round top ▶
- Our universal table, with which you can drill at any angle up to 90° on five sides of a cube ▶

The Cincinnati Gilbert Machine Tool Company

Or, if you don't get to the Show, it will pay you to write for these new bulletins, and ask us for a proposal:

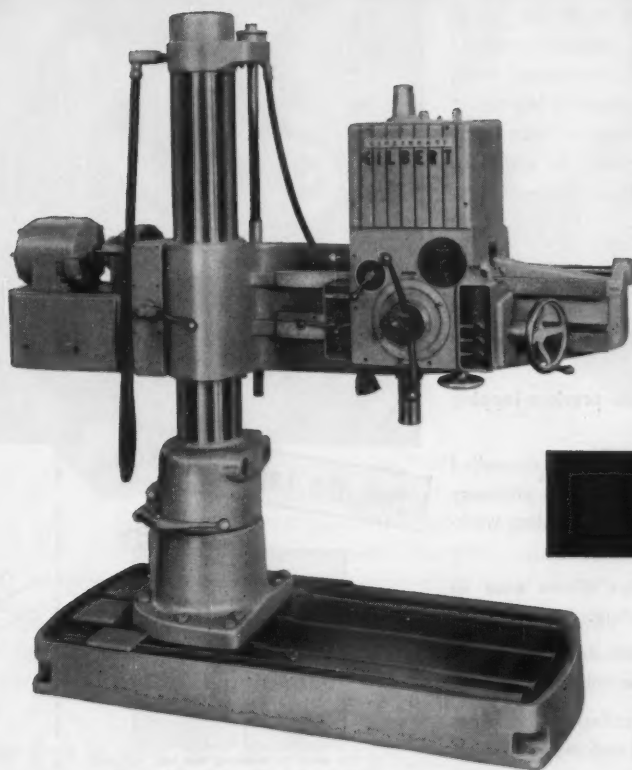
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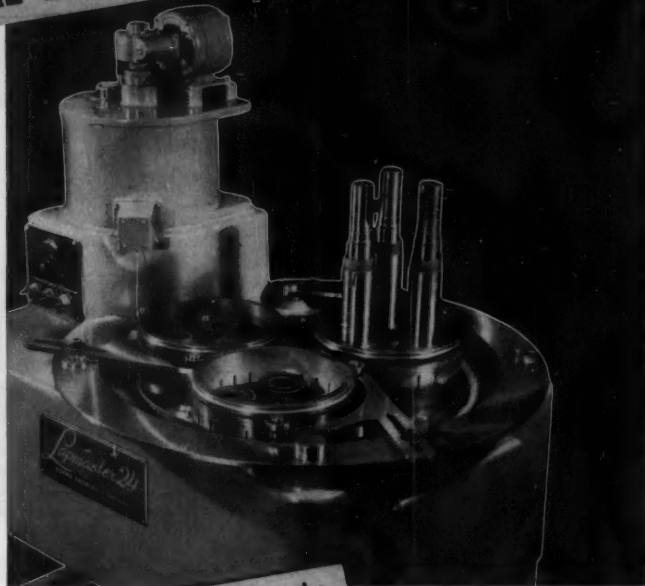
WITH A LAPMASTER

Here is the machine to do the job if you want precision flatness in production quantities at an economical rate. Lapmaster machines readily lap to the extreme close tolerance of one light band (0000116") or less. In addition, they produce an extremely fine finish to as low as 1 RMS.

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1. Operator requires no previous lapping experience.
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4. Loose abrasive distributed evenly over lapping area insures uniform results.
5. Serrated lap plate collects and disposes of spent compound and removed stock.
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7. Self-conditioning lap plate eliminates down time for truing or replacement.

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How the Lapmaster Works

The work being lapped causes wear on heavy cast iron lap plate.

As the work is wearing the lap, the conditioning rings are continually conditioning the lapping plate surface.

Since the wear action of the conditioning rings is greater than the wear caused by the work being lapped, the flatness of the lap plate is automatically maintained.

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CRANE PACKING COMPANY

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MACKLIN has long had the reputation for producing the highest quality grinding wheels for all types of production and specialized grinding requirements. Macklin's contributions to the general improvement of grinding wheels in their twenty-eight year history have been many.

The latest, the patented and proved M M process bids well to be one of the greatest single improvements of all time. The unique construction of this new wheel with its self dressing qualities makes it a must on those difficult jobs that have been causing you trouble.

Regardless of what your grinding problem may be, or even though you may not feel that you have a problem, you owe it to yourself to fully investigate how Macklin can assist you in improving your grinding costs.

Call your Macklin distributor or factory man today.

Write for complete information to Dept. 54

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Manufacturers of GRINDING WHEELS AND OTHER ABRASIVE PRODUCTS

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Left: This model R B is designed for joining the ends of coils in continuous process lines. Galvanizing, Pickling, Annealing and Slitting lines are some of the continuous processes requiring Morton equipment. This is one of ten Morton models designed for Shearing, Welding, Trimming or Rolling materials to meet the requirements of ferrous and non-ferrous industries.

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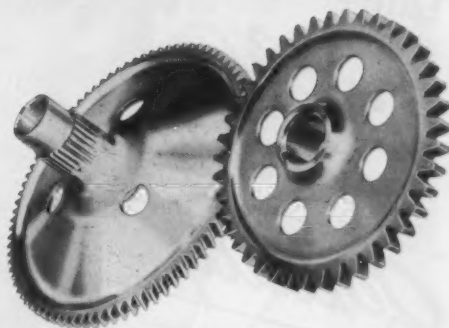
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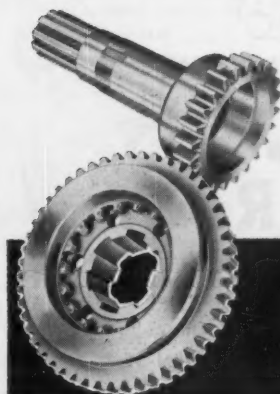
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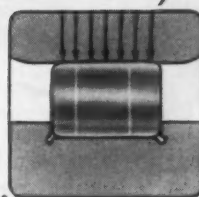
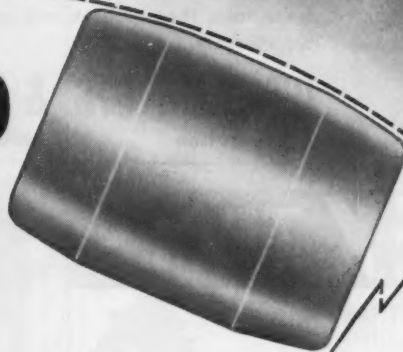
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MACHINERY, September, 1955—563



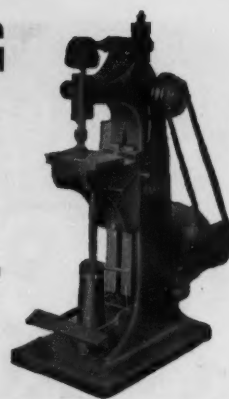
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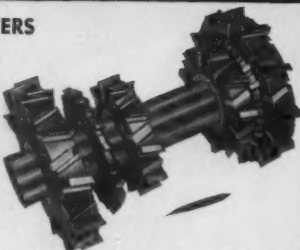
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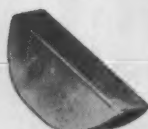


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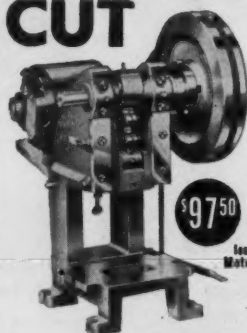
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AUTOMATICALLY

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MACHINERY, September, 1955—565

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The Model 75-24
Kaufman Tapper

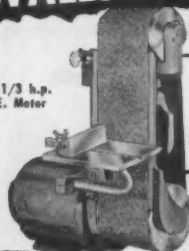
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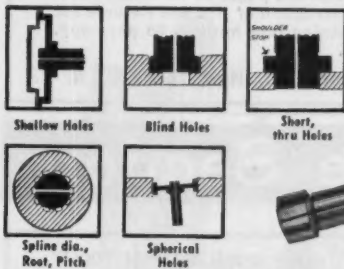
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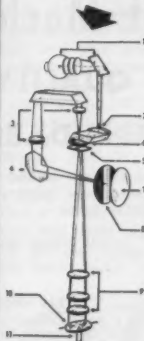
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24" Cincinnati Bickford, m.d.
28" Aurora, m.d., taper
32" Aurora, belt drive
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No. 3 Colburn Mfg. Type, m.d.
No. 315 Baker Heavy Duty, s.p.d.
No. 417 Baker, m.d. later type
No. 513 Baker, m.d.
#4-43" DeLance Machine Co. Drill, m.d.

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No. 6 Fellows, belt drive
No. 7, 7A Fellows Gear Shapers, belted, m.d.
No. 18 Fellows Gear Finishing Machine, m.d.
No. 61 Fellows, belted, m.d.
No. 61 Fellows, gear box m.d.
No. 61A Fellows, m.d., latest type
No. 648 Fellows, m.d.
No. 645A3 Fellows, m.d.
No. 75 Fellows High Speed, m.d.
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No. 712 Fellows, m.d.
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No. 36BM Gould & Eberhardt Spur Gear Cutter
Gleason Spiral Bevel Gear Rougher, m.d.
No. 3—36" Brown & Sharpe Gear Cutter
No. 48 Fellows Gear Burnisher
No. 58 Fellows Gear Burnisher
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8" Gleason Gear Generator, m.d.
11" Gleason Gear Generator, m.d.
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Cincinnati Gear Burnisher, m.d.

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9" Pratt & Whitney Hydraulic Spur and Helical
No. 1315 Fellows Gear Lapper, m.d.
SG11 Gear Grinding Machine, m.d., latest
GG19 Gear Grinding Machine, m.d., latest
GG31 Gear Grinding Machine, Internal Gear & Spline
Grinder, m.d.

The above is only a partial listing

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Grinder, m.d.
18" National Broach Red Ring Gear Lapper, m.d., late

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No. 5AC Lees-Bradner Heavy Type Gear Generator, m.d.
No. 12 Barber-Colman Double Overarm, m.d.
No. 12 Barber-Colman Single Overarm, m.d.
No. 34 Brown & Sharpe, m.d., Spur & Spiral
No. 44 Brown & Sharpe, m.d.
#130 Cleveland Rigid Hobber

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12" National Broach & Machine Co.
18" National Broach & Machine Co.
18" Gleason Bevel Gear Tester, m.d.
No. 471 Michigan Tool Co. Hob, Reamer & Gear Checker

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No. 76 Van Norman Automatic Piston Turning & Grinding
Machine, m.d.
Kwick-Way Model H Piston Turning & Grinding Machine,
m.d.

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#44 & 49 Exello Double End

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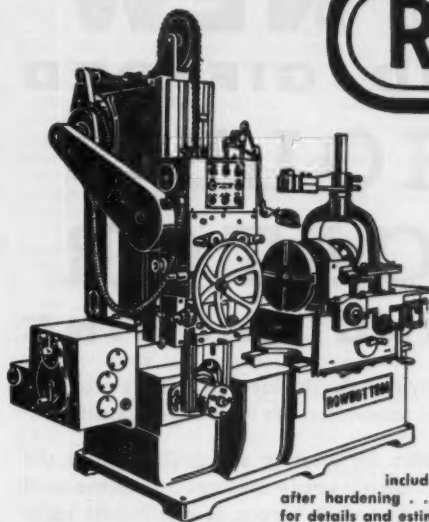
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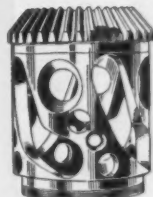
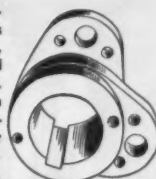


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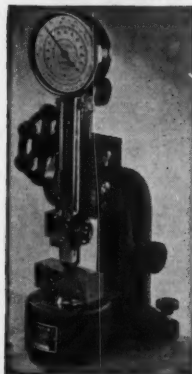
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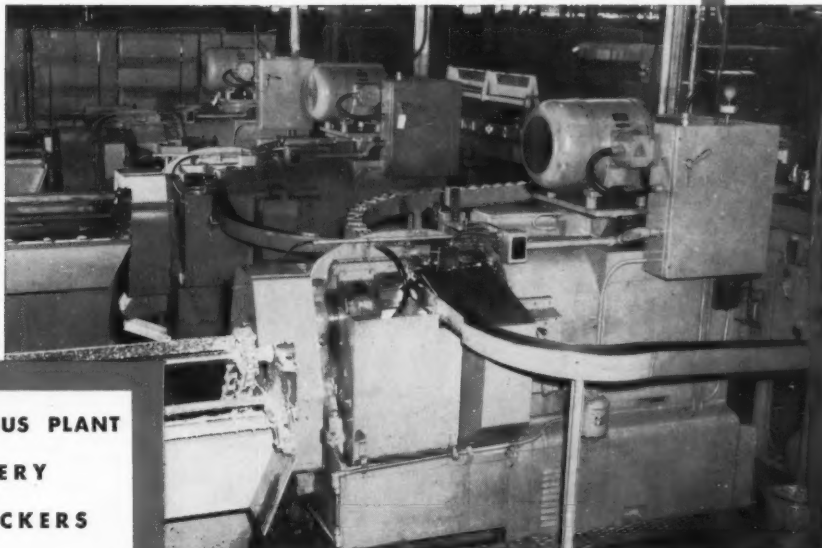
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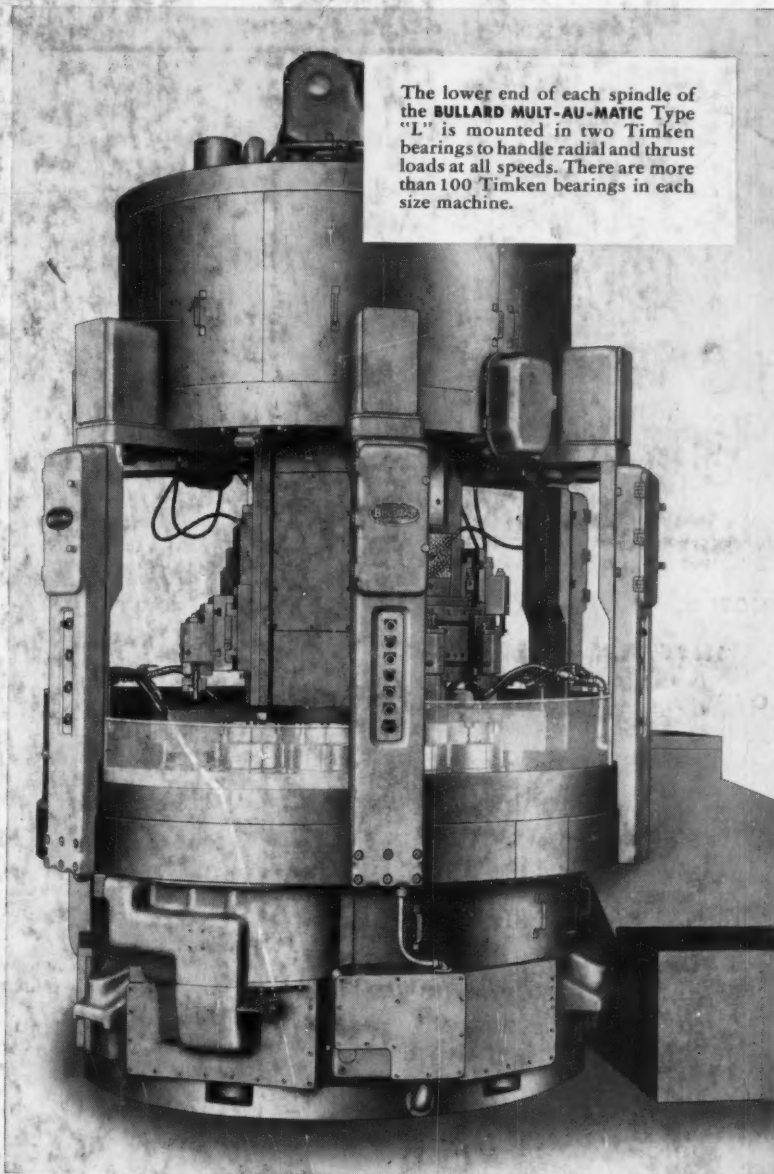
Timken bearings are geometrically designed for true rolling motion, and precision manufactured to live up to their design.

To insure quality, we even make our own steel. We're America's only bearing manufacturer that does. And we make it nickel-rich for added toughness.

So whether you buy or build machine tools, specify Timken bearings. You'll find the trademark "Timken" on every bearing. It's your assurance of high quality. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable: "TIMROSCO".



This symbol on a product means its bearings are the best.

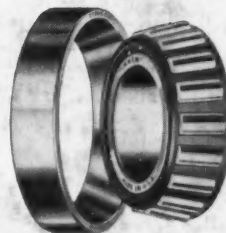


The lower end of each spindle of the **BULLARD MULTI-AU-MATIC** Type "L" is mounted in two Timken bearings to handle radial and thrust loads at all speeds. There are more than 100 Timken bearings in each size machine.

DON'T MISS THE TIMKEN BEARING DISPLAY

You'll want to see The Timken Roller Bearing Company display at the Production Engineering Show, booths 425 and 426, September 6 through 16, Navy Pier, Chicago.

TIMKEN
TRADE-MARK REG. U.S. PAT. OFF.
TAPERED ROLLER BEARINGS



NOT JUST A BALL ○ NOT JUST A ROLLER □ THE TIMKEN TAPERED ROLLER □ BEARING TAKES RADIAL □ AND THRUST — □ — LOADS OR ANY COMBINATION — □